TRU-TRAC®/ TX®

SERVICE MANUAL

Tru-Trac® Traction Unit- Model 4779

TX® Traction Unit- Model 4759

Applies to Serial numbers 1000 and above

CHATTANOOGA GROUP A DIVISION OF encore MEDICAL

ISO 13485 Certified

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FOREWORD

Read, understand, and follow the Safety Precautions and all other information contained in this manual.

This manual contains the necessary safety and field service information for those field service technicians, certified by Chattanooga Group, to perform field service on the Tru-Trac and TX unit.

At the time of publication, the information contained herein was current and up-to-date. However, due to continual technological improvements and increased clinical knowledge in the field of traction therapy, as well as Chattanooga Group's policy of continual improvement, Chattanooga Group reserves the right to make periodic changes and improvements to their equipment and documentation without any obligation on the part of Chattanooga Group.

It is the sole responsibility for certified field technicians to stay informed and trained in the latest technology utilized in the Tru-Trac and TX units by Chattanooga Group. From time to time, as significant improvements are incorporated, service bulletins will be produced and made available on our web site (chattgroup.com) in lieu of reprinting a complete manual prematurely. These service bulletins will provide updated service information and technological improvements to the Tru-Trac and TX unit for use by certified service technicians.

Due to the complex nature of the technology utilized by Chattanooga Group, the recommended troubleshooting techniques are to determine "Bad Board" and board replacement only. No board component level troubleshooting is recommended, nor will information or parts be supplied by Chattanooga Group.

Any board component level troubleshooting performed will be at the sole risk and liability of the certified field service technician performing such troubleshooting techniques. Performance of such techniques may render the warranty null and void.

Tru-Trac and TX® are prescription devices to be used only under the supervision of and by the order of a physician or other licensed health care provider.

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1- THEORY OF OPERATION

1.1 OVERVIEW

The Tru-Trac and TX traction unit is comprised of several pieces of proprietary hardware and software causing the unit to function as required allowing administration of traction therapy under the prescription and supervision of a licensed medical practitioner.

The Touch Screen Assembly houses the necessary hardware and software to communicate to the Motor Control Board. Communicates commands and limits as established by the user through use of the Touch Screen. The Touch Screen Assembly, in conjunction with the Motor Control Board, monitors the functionality of the entire system during the course of the traction therapy being administered. Should the unit malfunction or a communication error occur, the unit will stop treatment and generate an error message to notify the operator of a possible problem.

The Touch Screen Assembly communicates to the Motor Control Board Assembly via a proprietary bus.

The Motor Control Board communicates to the Touch Screen Assembly throughout the therapy session all parameters via feedback from the Motor Assembly and the Load Cell Assembly.

The Touch Screen Assembly incorporates a Patient Data Card Reader/Writer for the purpose of storing Patient Treatment Data that can then be downloaded to a PC equipped with the optional PDMS System.

2- SAFETY PRECAUTIONS

2.1 PRECAUTIONARY DEFINITIONS

The precautionary instructions found in this section and throughout this manual are indicated by specific symbols. Understand these symbols and their definitions before operating this equipment. The definition of these symbols are as follows:

A. Caution

Text with a "CAUTION" indicator will explain possible safety infractions that could have the potential to cause minor to moderate injury or damage to equipment.

⚠ CAUTION

B. Warning

Text with a "WARNING" indicator will explain possible safety infractions that will potentially cause serious injury and equipment damage.

⚠ WARNING

C. Danger

Text with a "DANGER" indicator will explain possible safety infractions that are imminently hazardous situations that would result in death or serious injury.

⚠ DANGER

D. Dangerous Voltage

Text with a "Dangerous Voltage" indicator serves to inform the technician of possible hazards resulting in the electrical charge disbursement from certain components if handled or serviced improperly.

E. NOTE

Throughout this manual, "NOTE" may be found. These Notes are helpful information to aid in the particular area or function being described.

2.2 PRECAUTIONARY INSTRUCTIONS

A. Cautions

⚠ CAUTION

- Read, understand, and practice all precautionary instructions found in this manual. Know the limitations and hazards associated with using any electrical traction device. Observe the precautionary and operational decals placed on the unit.
- Do not use accessories other than those supplied with the unit or recommended by Chattanooga Group. The safety of other products has not been established, and their use could result in injury to the patient.
- This unit should be transported and stored in temperatures between 0°F and 140°F (-18°C and 60°C) to prevent damage to the unit or its components.
- DO NOT operate this unit in an environment where other devices are being used that intentionally radiates electromagnetic energy in an unshielded manner. Portable and mobile RF communications equipment can affect Medical Electrical Equipment.
- This unit generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. Harmful interference to other devices can be determined by turning this (table, unit, device, etc.) on and off. Try to correct the interference using one or more of the following: reorient or relocate the receiving device, increase the separation between the equipment, connect the equipment to an outlet on a different circuit from that which the other device(s) are connected and consult the Chattanooga Group Service Department for help.
- The unit should be routinely checked before each use to determine all controls function normally.
- Handle the unit with care. Inappropriate handling of the unit may adversely affect its characteristics.
- Before each use, inspect the Traction Cord for wear. Prolonged wear on the cord will cause it to break, which may cause sudden release of traction pressure on a patient.
- Test the Patient Interrupt Switch before each use for power operation.

2.2 PRECAUTIONARY INSTRUCTIONS (continued)

B. Warnings

⚠ CAUTION

- Do not remove the cover. This may cause unit damage, malfunction, electrical shock, fire, or personal injury. There are no user-serviceable parts inside the unit. If a malfunction occurs, discontinue use immediately, disconnect the Mains Power Cord from the outlet, and consult the dealer for repair service.
- Do not use sharp objects such as a pencil point or ballpoint pen to operate the buttons on the LCD base as damage may result.
- Do not permit any foreign materials or liquids to enter the unit. Take care to prevent any foreign materials including, but not limited to, inflammables, water, and metallic objects from entering the unit. These may cause unit damage, malfunction, electrical shock, fire, or personal injury.
- Do not disassemble, modify, or remodel the unit or accessories. This may cause unit damage, malfunction, electrical shock, fire, or personal injury.
- Do not use the traction unit near devices such as X-ray units or diathermy units. These units may emit high frequency noise that may affect the operation of the unit.
- Failure to use and maintain the traction unit and its accessories in accordance with the instructions outlined in this manual will render the warranty void.
- In the event of a loss of power to the unit or when quick release is needed, traction tension should only be released by having the patient move towards the traction head to release the tension on the rope. Once the tension on the rope has been released, loosen the patient harness adjustment straps.
- The tool, lubrication, and locking compound requirements listed are critical to component removal and replacement of the unit.
- The hardware, bolts, nuts, and screws used to assemble the Tru-Trac and TX are SAE and Metric. Therefore, it will be necessary to obtain both SAE and Metric tools for removal and replacement of components.
- The lubricant and locking compound listed are crucial in the assembly of certain components to ensure patient safety and efficient operation of the unit.

⚠ WARNING

- Use of controls or adjustments or performance of procedures other than those specified herein may result in a hazardous traction related injury.
- Before connecting the unit to an electrical outlet, make certain the unit is electrically grounded by connecting only to a grounded electrical service receptacle conforming to the applicable national and local electrical codes.
- Do not use a damaged Mains Power Cord. Using a damaged Mains Power Cord may cause unit damage, malfunction, electrical shock, fire, or personal injury. If the Mains Power Cord becomes damaged, discontinue use immediately and contact the dealer for replacement of the Mains Power Cord.
- This device should be kept out of the reach of children.
- Always hand tighten the Lock Knob securely to avoid any slippage.
- Care must be taken when operating this unit, adjacent to or stacked with other equipment. Potential electromagnetic or other interference could occur to this or other equipment. Try to minimize this interference by not using other equipment in conjunction with it.
- In the event of a loss of power to the unit, traction tension should only be released by gradually lengthening the patient harness adjustment straps.
- Dispose of all products in accordance with local and national regulations and codes.
- In the event that an Error message or Warning appears beginning with a 2 or 3, immediately stop all use of the system and contact the dealer or Chattanooga Group for service. Errors and Warnings in these categories indicate an internal problem with the unit that must be tested by Chattanooga Group or a Field Service Technician certified by Chattanooga Group before any further operation or use of the unit. Use of a unit that indicates an Error or Warning in these categories may pose a risk of injury to the patient, user, or may cause extensive internal damage to the unit.
- Unit failing Dielectric Withstand and/or Leakage Tests could indicate serious internal problems. DO NOT place the back into service! Send unit to factory for repair! DO NOT attempt to repair the unit in the field!
- Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.
- When performing Unit Calibration Procedure, the Calibration Fixture Load Cell must be set to US lbs.

2.2 PRECAUTIONARY INSTRUCTIONS (continued)

⚠ WARNING

- Use only accessories that are specially designed for this unit. Do not use accessories manufactured by other companies on this (table, unit, device, etc.). Chattanooga Group is not responsible for any consequence resulting from using products manufactured by other companies. The use of other accessories or cables may result in increased emissions or decreased immunity of this (table, unit, device, etc.).
- This component removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

COMPLETE CALIBRATION OF UNIT
Refer to Section 7
AND
MINIMUM OF 2 HOUR BURN IN OF UNIT AFTER SUCCESSFUL CALIBRATION- Refer to Section 7

Failure to perform either of these procedures, after a component or assembly replacement will void warranty and may result in injury to patients and/or severe equipment damage.

- It is not recommend tying a new knot in a cord that has frayed or failed in use or is worn in an area from constant use. The cord must be replaced.

C. Dangers

⚠ DANGER

- DO NOT connect the unit to an electrical supply without first verifying that the power supply is the correct voltage. Incorrect voltage may cause unit damage, malfunction, electrical shock, fire, or personal injury. Your unit was constructed to operate only on the electrical voltage specified on the Voltage Rating and Serial Number Plate. Contact the Chattanooga Group dealer if the unit is not properly rated.
- Power Supplies retain High Voltage!
- Discharge the C4 Capacitor prior to complete removal of the Power Supply.
- Discharge the C4 Capacitor prior to handling of the new Power Supply.
- Tru-Trac and TX® is a prescription device to be used only under the supervision of and by the order of a physician or other licensed health care provider.
- Do not use any other knot styles in the Cord other than those specified in this manual. Use of other knot styles could cause Cord to completely disengage from the system and may cause serious injury to patient and personnel.

3- NOMENCLATURE

3.1 TRU-TRAC AND TX UNIT EXTERNAL COMPONENTS

The nomenclature graphics below, Figure 3.1, indicate the general locations of the major external components of the Tru-Trac and TX traction unit.

Know the components and their functions before performing any operation of or service to the Tru-Trac and TX traction unit.

FIGURE 3.1

1. Touch Screen Assembly
2. Top and Cord Guide Cover
3. Traction Cord Knuckle
4. Front Cover
5. Patient Interrupt Switch Receptacle
6. Side Cover
7. Clamp Assembly Knob
8. Rear Cover
9. Mains Power Cord Receptacle
10. On/Off Power Switch

3.2 INTERNAL COMPONENTS

The nomenclature graphics below, Figure 3.2, indicate the locations of the major internal components of the Tru-Trac and TX traction unit.

Know the components and their functions before performing any operation of or service to the Tru-Trac and TX traction unit.

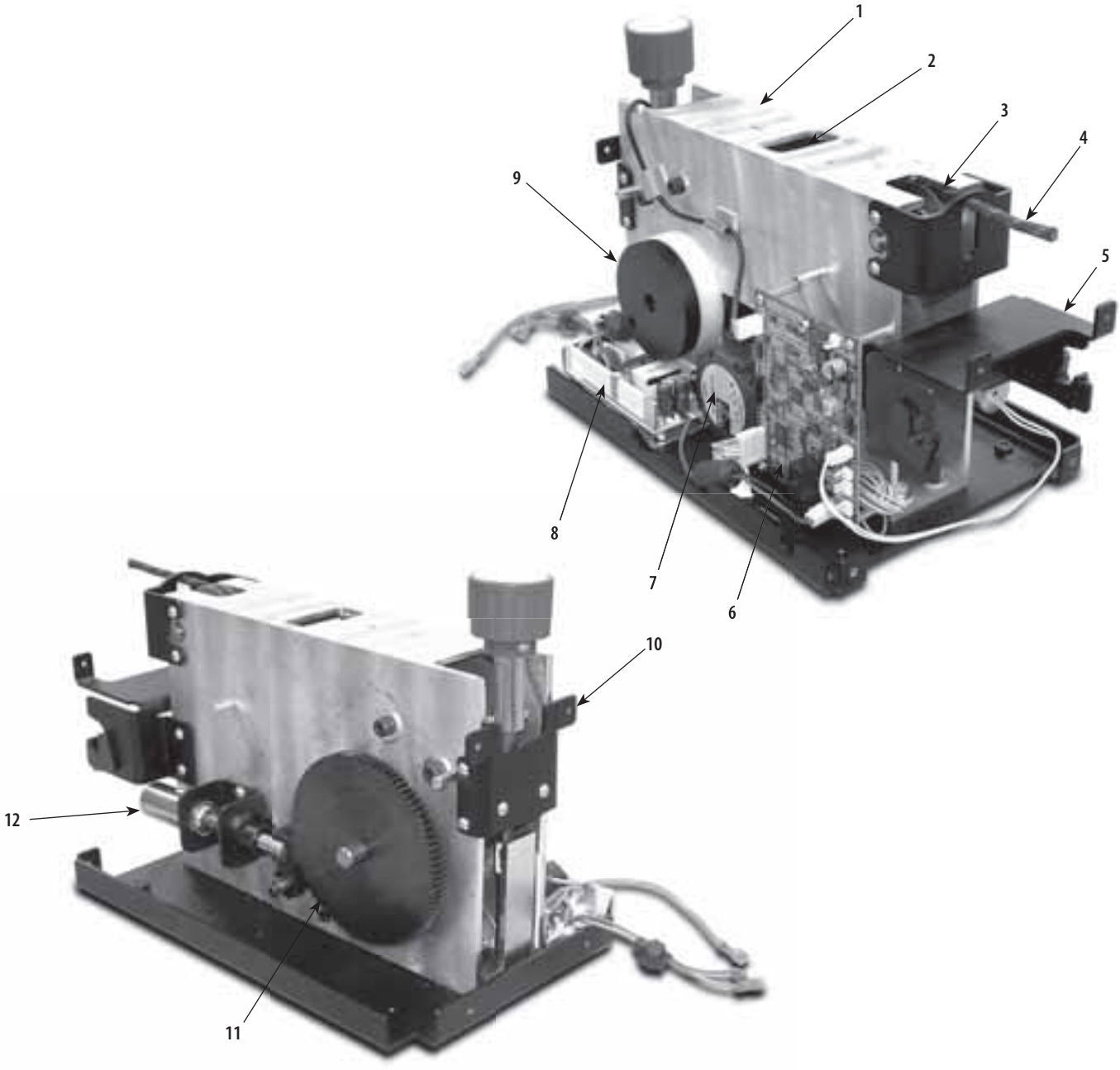


FIGURE 3.2

1. Chassis
2. Load Cell
3. Top Front Traction Cord Guide
4. Traction Cord
5. Front Cover Mounting Bracket
6. Motor Control Board
7. Motor Assembly
8. Power Supply
9. Cord Tension Spring and Housing
10. Clamp Spring Assembly
11. Large Driven Gear
12. Solenoid Assembly

4- SPECIFICATIONS

4.1 PHYSICAL SPECIFICATIONS

FIGURE 4.1

Width . . . . . 24 cm (9.5 in)
Depth . . . . . 45 cm (17.5 in)
Height . . . . . 45 cm (17.5 in)

Weight
Standard Weight . . . . . .14 kg (30 lbs)
Shipping Weight . . . . . .18 kg (40 lbs)

Power
Voltage. . . . . 100 V-240 V (50/60 Hz)
Power Consumption . . . . . 75 VA
Current Consumption . . . . . 3.2 A Max
Electrical Class . . . . . .Class I
Electrical Type . . . . . .Type B

Traction Modes. . . . . Static, Intermittent, Cyclic, and their combinations.
Traction Type . . . . . Mechanical
LCD Display . . . . . .High contrast monochrome Touch Screen

Regulatory Compliance
Meets Directive 93 /42 /EEC
IEC/UL/EN: 60601-1 and 60601-1-2
CAN C22.2 No. 601.1-M90w/AZ

CE 0413

TRACTION TENSION SPECIFICATIONS			
PARAMETERS	**MINIMUM**	**MAXIMUM**	**INCREMENTS**
Traction Period	1 minute	99 minutes	1 minute
Hold Period	0 seconds	99 seconds	1 second
Rest Period	0 seconds	99 seconds	1 second
Traction Tension	0 kg (0 lb/0 N)	90 kg (200 lb/890 N)	1 kg (1 lb/5 N)
Progrssive and Regressive Steps	1 step	9 steps	1 step

5- TROUBLESHOOTING

5.1 TRU-TRAC AND TX ERROR MESSAGES

A. The following information is provided as an aid in defining the Software Error Messages of the Tru-Trac and TX traction unit. Once a particular Error Message is defined, the information will also list probable causes and possible remedies. Once the problem area is determined, subsequent tests for verification will be necessary to determine the subassembly or PC Board to be replaced. In the case of PC Boards, all troubleshooting and tests will be to validate a "Bad Board" only. No component level troubleshooting information is or will be provided by Chattanooga Group for field troubleshooting of PC board components.

B. Once a particular subassembly or PC Board has been determined as bad, refer to the appropriate Removal & Replacement Section for the board affected and follow the instructions for replacement of the board.

ERROR CODE	ERROR TYPE	DEFINITION	PROBABLE CAUSES	POSSIBLE REMEDY
USER CORRECTABLE WARNING MESSAGES				
100	WARNING	Treatment has been running for 8 seconds, but no tension is detected on the Cord.	Too much slack in Traction Cord	Remove Traction Cord Slack.
101	WARNING	Patient pressed Patient Switch.	Patient Interrupt Switch button pressed.	Touch the Touch Screen to clear message.
102	WARNING	Patient Switch is unplugged.	Patient Interrupt Switch not properly connected to unit.	Properly connect Patient Interrupt Switch and touch Touch Screen to clear message.
104	WARNING	User selected Patient Card button on utilities screen, but no traction treatments were found on the card.	Wrong or bad Patient Data Card inserted into unit.	Insert correct Patient Data Card.
105	WARNING	User selected save to card, but no card is inserted into the unit.	No Patient Data Card inserted.	Properly insert correct Patient Data Card into unit.
106	WARNING	User selected save to card, but the card currently inserted is not a Patient Card.	Wrong or bad Patient Data Card inserted into unit.	Insert correct Patient Data Card.
107	WARNING	User selected save to card, but the card currently inserted is full.	Memory full on Patient Data Card used.	Save Data to PDMS and erase Patient Data Card.
108	WARNING	User typed in a blank patient name.	No Patient ID assigned.	Enter Patient ID.
109	WARNING	User typed in a blank protocol name.	No Protocol name entered.	Enter Protocol name.
110	WARNING	User attempted to access a MMC function, but no MMC is inserted into the unit.	No Multimedia Card (MMC) inserted into unit.	Insert Multimedia Card (MMC) into unit.
111	WARNING	User attempted to upgrade software, but the MMC in the unit is not a software upgrade MMC.	Wrong Multimedia Card (MMC) inserted into unit.	Insert proper Mutimedia Card (MMC).
112	WARNING	Error upgrading Control Board software.	Unknown	Contact Dealer or Chattanooga Group for Service.
113	WARNING	Error upgrading motor board software.	Unknown	Contact Dealer or Chattanooga Group for Service.
114	WARNING	User pressed START, but has not yet set the Max Level value to a value greater than zero.	User has not completed Treatment Set Up.	Complete Treatment Set Up prior to pressing START.
115	WARNING	User pressed HOME button from treatment review screen while a treatment was running.	Home button has been pressed.	Press STOP to end treatment prior to pressing HOME.

5.1 TRU-TRAC AND TX ERROR MESSAGES (continued)

WARNING

In the event that an Error message or Warning appears beginning with a 2 or 3, immediately stop all use of the unit and contact the dealer or Chattanooga Group for service. Errors and Warnings in these categories indicate an internal problem with the unit that must be tested by Chattanooga Group or a Field Service Technician certified by Chattanooga Group before any further operation or use of the unit. Use of a unit that indicates an Error or Warning in these categories may pose a risk of injury to the patient, user, or may cause extensive internal damage to the unit.

ERROR CODE	ERROR TYPE	DEFINITION	PROBABLE CAUSES	POSSIBLE REMEDY
ERROR MESSAGES (200-223) REQUIRING TECHNICAL ASSISTANCE				
200	ERROR	The motor PCB has reset.	Motor Control Board is bad.	If the Error repeats routinely, replace Motor Control Board.
201	ERROR	Error communicating with the realtime clock chip.	Control Board Communication Error.	If the Error repeats routinely, replace Touch Screen Assembly.
202	ERROR	The motor PCB returned an error while performing the zero Load Cell function.	Bad Load Cell Assembly Motor Control Board Communication Error.	**1.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **2.** Replace Load Cell Assembly. **3.** Replace Motor Control Board. **4.** Replace Touch Screen Assembly.
203	ERROR	Timeout waiting for the motor PCB to perform the zero Load Cell calibration.	Bad Load Cell Bad Motor Control Board	**1.** Ensure there is slack in the Cord. **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Load Cell. **4.** Replace Motor Control Board.
204	ERROR	Timeout waiting for the motor PCB to perform the motor current calibration.	Motor Control Board Communication Error.	**1.** Ensure there is no slack in the Cord. **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Load Cell. **4.** Replace Motor Control Board.
205	ERROR	A Motor fault error has occurred while a treatment was running.	Internal mechanical jam of unit. Bad Motor Control Board or Motor Assembly.	**1.** Correct any internal mechanical jam. **2.** Replace bad Motor Control Board or bad Motor Assembly.
206	ERROR	The Motor PCB cannot get to the desired tension.	Internal Mechanical Jam of unit. Bad Motor Control Board or Motor Assembly.	**1.** Correct any internal mechanical jam. **2.** Replace bad Motor Control Board or bad Motor Assembly.
207	ERROR	We have detected a motor current error (MC_MON pin on motor PCB).	Unit out of calibration.	Perform Unit Calibration and Burn In procedures.
208	ERROR	We have detected a Load Cell limit error (LC_MON pin on motor PCB).	Unit is out of calibration. Bad Motor Control Board. Bad Load Cell Assembly.	**1.** Perform Unit Calibration and Burn In procedures. **2.** Replace Motor Control Board. **3.** Replace Load Cell Assembly.
209	ERROR	Error erasing a patient card.	Bad Patient Data Card. Bad Touch Screen Assembly.	**1.** Try known good Patient Data Card. **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Touch Screen Assembly.
210	ERROR	CRC not correct on treatment just read from Patient Card.	Bad Patient Data Card. Bad Touch Screen Assembly.	**1.** Try known good Patient Data Card. **2.** Replace Touch Screen Assembly.
211	ERROR	Error reading default protocol on power up so must rebuild protocols to factory presets.	EEPROM is corrupt.	If the Error repeats routinely, replace Touch Screen Assembly.
212	ERROR	The Motor PCB flagged a comm watchdog error.	Touch Screen Assembly did not poll Motor Control Board in a reasonable amount of time.	**1.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **2.** If the Error repeats routinely, replace Touch Screen Assembly.
213	ERROR	Motor PCB has indicated that the zero calibration value is invalid and needs to be calibrated.	Unit is out of calibration.	Perform Unit Calibration and Burn In procedures.

5.1 TRU-TRAC AND TX ERROR MESSAGES (continued)

WARNING

In the event that an Error message or Warning appears beginning with a 2 or 3, immediately stop all use of the unit and contact the dealer or Chattanooga Group for service. Errors and Warnings in these categories indicate an internal problem with the unit that must be tested by Chattanooga Group or a Field Service Technician certified by Chattanooga Group before any further operation or use of the unit. Use of a unit that indicates an Error or Warning in these categories may pose a risk of injury to the patient, user, or may cause extensive internal damage to the unit.

ERROR CODE	ERROR TYPE	DEFINITION	PROBABLE CAUSES	POSSIBLE REMEDY
ERROR MESSAGES (200-223) REQUIRING TECHNICAL ASSISTANCE (continued)				
214	ERROR	User has configured a treatment such that it takes too much memory to compute the treatment steps. Unit will default back to the default power up protocol.	Under normal operating conditions, this Error should never appear.	Remove unit from service and report exact treatment parameters to Chattanooga Group.
215	ERROR	Internal error, unit cannot get the next treatment step information, treatment is terminated.	Multimedia Card (MMC) Data is corrupt. Multimedia Card (MMC) interface not working.	**1.** Try known good Multimedia Card (MMC). **2.** Remove unit from service and report exact treatment parameters to Chattanooga Group.
217	ERROR	Error reading a MMC.	Bad Mutimedia Card (MMC). Improper cable connection to Motor Control Board. Bad Touch Screen Assembly.	**1.** Try known good Multimedia Card (MMC). **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Touch Screen Assembly.
218	ERROR	Error upgrading Control Board software.	Bad Mutimedia Card (MMC). Improper cable connection to Motor Control Board. Bad Touch Screen Assembly.	**1.** Try known good Multimedia Card (MMC). **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Touch Screen Assembly.
219	ERROR	Error upgrading Control Board software.	Bad Mutimedia Card (MMC). Improper cable connection to Motor Control Board. Bad Touch Screen Assembly.	**1.** Try known good Multimedia Card (MMC). **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Touch Screen Assembly.
220	ERROR	Error upgrading Motor Control Board software.	Bad Mutimedia Card (MMC). Improper cable connection to Motor Control Board. Bad Motor Control Board. Bad Touch Screen Assembly.	**1.** Try known good Multimedia Card (MMC). **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Motor Control Board. **4.** Replace Touch Screen Assembly.
221	ERROR	Error upgrading Motor Control Board software.	Bad Mutimedia Card (MMC). Improper cable connection to Motor Control Board. Bad Motor Control Board. Bad Touch Screen Assembly.	**1.** Try known good Multimedia Card (MMC). **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Motor Control Board. **4.** Replace Touch Screen Assembly.
222	ERROR	Patient switch is shorted.	Patient Interrupt Switch not completely seated in connector. Bad Patient Interrupt Switch. Bad Patient Interrupt Switch Connector.	**1.** Properly connect Pateint Interrupt Switch to unit. **2.** Use a known good Pateint Interrupt Switch. **3.** Replace Patient Interrupt Switch Connector on unit.
223	ERROR	Beta version evaluation period has expired.	Unit is designated BETA Test Unit.	Immediately return unit to Chattanooga Group.

5.1 TRU-TRAC AND TX ERROR MESSAGES (continued)

WARNING

In the event that an Error message or Warning appears beginning with a 2 or 3, immediately stop all use of the unit and contact the dealer or Chattanooga Group for service. Errors and Warnings in these categories indicate an internal problem with the unit that must be tested by Chattanooga Group or a Field Service Technician certified by Chattanooga Group before any further operation or use of the unit. Use of a unit that indicates an Error or Warning in these categories may pose a risk of injury to the patient, user, or may cause extensive internal damage to the unit.

ERROR CODE	ERROR TYPE	DEFINITION	PROBABLE CAUSES	POSSIBLE REMEDY
CRITICAL ERRORS (300-314) DEMANDING TECHNICAL SERVICE				
300 through 307	CRITICAL ERROR	Communication Error between Touch Screen and Motor Control Board.	Communication Error.	**1.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **2.** Replace Motor Control Board. **3.** Replace Touch Screen Assembly.
308	CRITICAL ERROR	We are supposed to be increasing tension, but tension is not increasing.	Slack in Cord. Bad Load Cell. Bad Motor Control Board.	**1.** Remove slack in Cord. **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Load Cell. **4.** Replace Motor Control Board.
309	CRITICAL ERROR	We are supposed to be decreasing tension, but tension is actually increasing.	Unit out of calibration. Bad Harness connection. Bad Load Cell. Bad Motor Control Board.	**1.** Perform Unit Calibration and Burn In procedures. **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Load Cell. **4.** Replace Motor Control Board.
310	CRITICAL ERROR	We are reading > 0 tension when we should be reading zero.	Unit out of calibration.	Perform Unit Calibration and Burn In procedures.
311	CRITICAL ERROR	We are reading < 0 tension when we should be reading zero.	Unit out of calibration. Bad Load Cell. Bad Motor Control Board.	**1.** Perform Unit Calibration and Burn In procedures. **2.** Check Cables and Harnesses for proper seating and connection on Motor Control Board. **3.** Replace Load Cell. **4.** Replace Motor Control Board.
312	CRITICAL ERROR	We have detected that the motor is running too fast.	Bad Motor Control Board. Bad Motor Assembly.	**1.** Replace Motor Control Board. **2.** Replace Motor Assembly.
313	CRITICAL ERROR	Internal memory error.	Bad Touch Screen.	Replace Touch Screen Assembly.
314	CRITICAL ERROR	Error reading EEPROM.	Bad Touch Screen.	Cycle power to unit. If the Error repeats, then replace Touch Screen Assembly.

NOTES

5.2 TRU-TRAC AND TX TRACTION UNIT TESTING

A. General- Electronic

1. Information within this section in respect to electronic components is intended to aid in troubleshooting the PCB's of the Tru-Trac and TX units to "Board Level" only. These tests are the standard testing procedures and methods used at the factory before shipment of the unit.
2. Due to the complex nature of the technology utilized by Chattanooga Group, the recommended PCB troubleshooting techniques are to determine "Bad Board" and board replacement only. No PCB component level troubleshooting is recommended nor will information or parts be supplied by Chattanooga Group. Any PC board component level troubleshooting performed will be at the sole risk and liability of the Service Technician performing such troubleshooting techniques.
3. Once a particular PCB has been determined as bad, replace the PCB. Use only Chattanooga Group replacement parts and hardware.

B. General- Replacement Components

Critical component replacement parts for the traction unit are available as subassemblies only. This is due to the accuracy required and the critical nature of the subassembly within the unit for power function and operation. Individual components of these subassemblies will not be made available by Chattanooga Group.

C. General- Tests and Repair Procedures

1. Certain tests and repair procedures require the use of special tools and/or fixtures. These will be listed at the particular test where they are required. Testing with any other special tool or fixture other than those stated could give erroneous readings or test results. Always perform the tests exactly as stated to ensure accurate results.
2. Test equipment settings will be listed for each test performed prior to the respective test to ensure the test is performed to Chattanooga Group standards and ensure power readings.
3. The troubleshooting and repair of the units are to be performed only by authorized technicians trained and certified by Chattanooga Group.

D. Tools, Fixtures, and Equipment Required

1. Dielectric Withstand (Hi-Pot) and ground resistance tester.

NOTE:
Adjust Dielectric Withstand tester to indicate fault with 120 kOhm load across the output when at specified test voltage.

2. Milliohm Meter
3. Digital Multimeter
4. Required Hand Tool
   - #1 Phillips Screwdriver
   - #2 Phillips Screwdriver
   - Flat Blade Screwdriver
   - Calibrated Torque Wrench- 200 inch pound or 2,500 Newton meter minimum capacity.
   - Allen Wrenches
     - SAE- 3/32, 5/32, and 9/64 in
     - Metric- 3 mm
   - Hex Key Sockets for Torque Wrench
     - SAE- 3/32 and 5/32 in
     - Metric- 4 mm
   - Needle Nose Pliers
   - Tape Measure- 12 ft (3 meter) minimum
   - Ratchet
   - 7mm Box End Wrench
   - Pick for removing connector wires.
5. Touch Screen to Cover Assembly Jig
6. Calibration Fixture with calibrated Strain Meter.
7. Solenoid Assembly Mounting Jig. P/N 48139.

⚠ CAUTION

The tool, lubrication, and locking compound requirements listed are critical to component removal and replacement of the unit.

The hardware, bolts, nuts, and screws used to assemble the Tru-Trac and TX are SAE and Metric. Therefore, it will be necessary to obtain both SAE and Metric tools for removal and replacement of components.

The lubricant and locking compound listed are crucial in the assembly of certain components to ensure patient safety and efficient operation of the unit.

5.3 VISUAL INSPECTION

A. General

Visually inspect the unit. A visual inspection can, to an experienced Technician, indicate possible abuse of the unit and internal problems.

5.4 GROUND RESISTANCE TEST

A. Voltage Specifications

Models 4759 and 4779.....Input: 100-240 VAC 50/60 Hz, 75 VA

B. Specification

Maximum Acceptable Resistance: 100 milliohms

C. Equipment Required

Milliohm Meter

D. Test

Place unit on level work surface.

Place one meter probe on the ground prong of power supply and the other to any exposed metal or screw on the unit. See Figure 5.1.

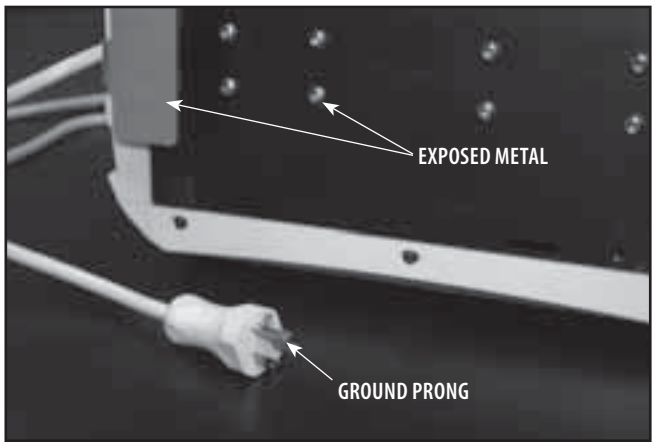


FIGURE 5.1

NOTE:
U.S.A. Power Cord Illustrated.

Unit is illustrated on its side.

5.5 LEAKAGE TESTS

⚠ WARNING

UNIT FAILING DIELECTRIC WITHSTAND AND/OR LEAKAGE TESTS COULD INDICATE SERIOUS INTERNAL SYSTEM PROBLEMS.
DO NOT PLACE UNIT BACK INTO SERVICE!
SEND UNIT TO FACTORY FOR REPAIR! DO NOT ATTEMPT TO REPAIR IN THE FIELD!

Test Voltage Spec.....1000 V

Conduct all necessary leakage tests as required per "Chapter 7 Electrical Equipment" of the 1999, or later, edition of the NFPA (National Fire Protection Association) "Health Care Facilities" standards. See Figure 5.2.

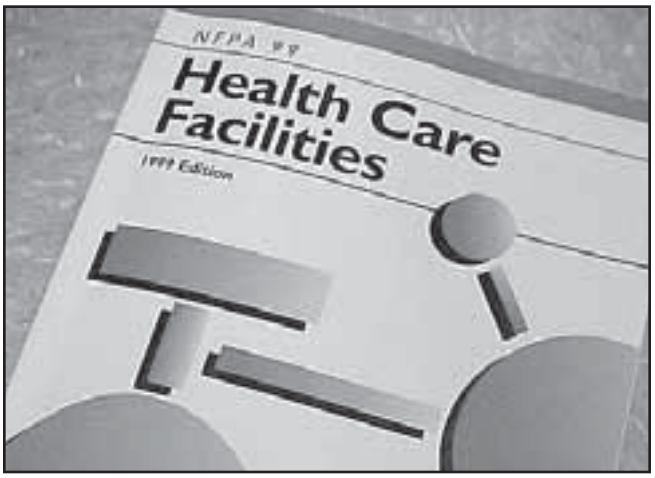


FIGURE 5.2

NOTE:
The NFPA "Health Care Facilities" standards are specific to the U.S.A. All other technicians should verify their country's requirements for these tests.

5.6 ON/OFF SWITCH TEST

A. Specification

Unit turns Off and On

B. Equipment Required

None

C. On/Off Switch Test Procedure

1. Place unit on level work surface.

2. Plug Power Cord into grounded power source with appropriate voltage. See Specifications on page 8.

3. Turn unit Off and back On with Power Switch. See Figure 5.3.

D. Test Result

1. If unit turns Off and On, unit passed test.

2. If unit does not turn Off and On, unit failed test. Refer to: 5.7 On/Off Switch Troubleshooting below.

FIGURE 5.3

5.7 ON/OFF SWITCH TROUBLESHOOTING

A. Specification

Appropriate AC voltage.

B. Equipment Required

Digital Multimeter

3/32 in Allen Wrench

C. On/Off Switch Troubleshooting Procedure

1. Disconnect unit from power source.Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.

2. Remove Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement.

3. Remove Rear Cover leaving harnesses connected. Refer to 6.3 Rear Cover Removal and Replacement.

4. Disconnect the Blue and Red wires from the Power Supply to the Power Switch. See Figure 5.4.

5. Set Multimeter to AC and to the appropriate voltage setting. Connect Multimeter Leads to the Blue and Brown wire Connectors from the Power Switch. See Figure 5.5.

6. Plug unit into a grounded power source with appropriate voltage. Turn Power Switch On and take reading from Multimeter.

D. Test Result

1. If Multimeter reads appropriate voltage, unit passed test. If unit will not power up, refer to 5.15 Power Supply Troubleshooting.

2. If Multimeter does not read appropriate voltage.

Replace Power Switch.

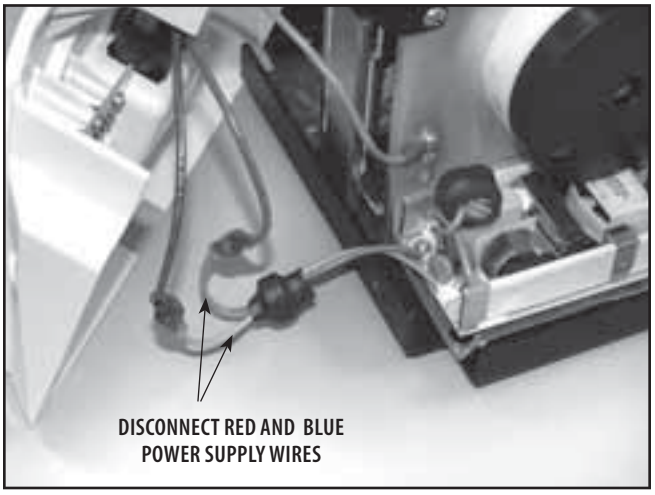


FIGURE 5.4

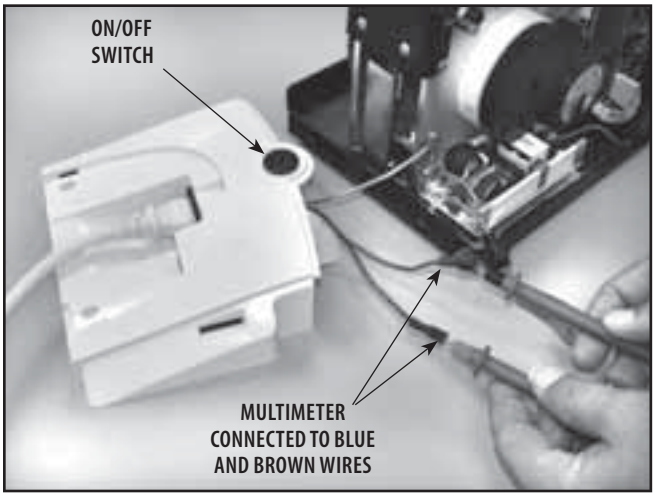


FIGURE 5.5

5.8 PATIENT INTERRUPT SWITCH TEST

A. Specification

Unit displays Error 101 or 102 at the respective test.

B. Equipment Required

None

C. Patient Interrupt Switch Test Procedure

1. Place unit on level work surface. Plug Power Cord into grounded power source with appropriate voltage.
2. Connect Patient Interrupt Switch to unit making certain it is completely seated in the Patient Interrupt Switch connector. See Figure 5.6.
3. Turn unit On with Power Switch. After unit has completely booted up, disconnect the Patient Interrupt Switch. Unit should display Error 102. See Figure 5.7.
4. Reconnect the Patient Interrupt Switch. Touch the Touch Screen anywhere to clear the Error.
5. Turn unit Off. with Patient Interrupt Switch connected to the unit, turn unit On with Power Switch.
6. After unit has completely booted up, depress the Patient Interrupt Switch button. The unit should display Error 101. Touch the Touch Screen anywhere to clear the Error. See Figure 5.8.

D. Test Result

1. If unit displays Errors 101 or 102 at the respective test, unit passed test.
2. If unit does not display Errors 101 or 102 at the respective test, unit failed test. Repeat test with a known good Patient Interrupt Switch.
3. If known good Patient Interrupt Switch resolves the problem, replace existing Patient Interrupt Switch with new part.
4. If the known good Patient Interrupt Switch does not remedy the problem, Replace Patient Interrupt Switch Jack.

FIGURE 5.6

FIGURE 5.7

FIGURE 5.8

5.9 CORD RELEASE AND RETRACT TEST

A. Specification

Release.....Cord releases with less than 5 lbs tension

Retract.....Cord completely retracts

B. Equipment Required

Calibration Fixture with calibrated Strain Meter.

C. Cord Release and Retract Test Procedures

1. Secure unit to the Calibration Fixture. See Figure 5.9.
2. Plug unit into approved power source and turn unit On.
3. After unit has completely booted, press and hold Rope Release on Touch Screen, and pull Cord out. Release Rope Release while holding Cord out. See Figure 5.10.

NOTE:
It may be necessary to pull and release slight tension on the Cord to allow the internal mechanism to release the stop on the Cord.

4. While holding on to extended Cord, press Rope Release on the Touch Screen and guide Cord back into unit.
5. Repeat step 3 above to connect the Cord to the Calibration Fixture. See Figure 5.11.
6. Set up unit for a static pull of 100 lbs. Refer to User Manual if necessary.
7. Press the START button. After the 100 lbs has been reached, press the STOP Button and view the Rope Release on the Touch Screen, it should be inactive.
8. Watch as the tension decreases. Once the tension decreases to below 5 lbs, the Rope Release should become active. Immediately press the Rope Release on the Touch Screen, pull enough Cord out to facilitate disconnection from the Calibration Fixture. Release the Rope Release control. Disconnect the Cord from the Calibration Fixture.

NOTE:
It may be necessary to apply and release slight tension on the Cord to allow the internal mechanism to release the stop on the Cord.

9. Repeat step 4.

D. Test Result

1. If Cord fails to release, unit failed test. Refer to 5.10 Cord Release Troubleshooting.
2. If Cord fails to completely retract, unit failed test. Adjust Cord Retraction Spring. Refer to page 42 beginning with step 13 for adjustment procedures.

FIGURE 5.9

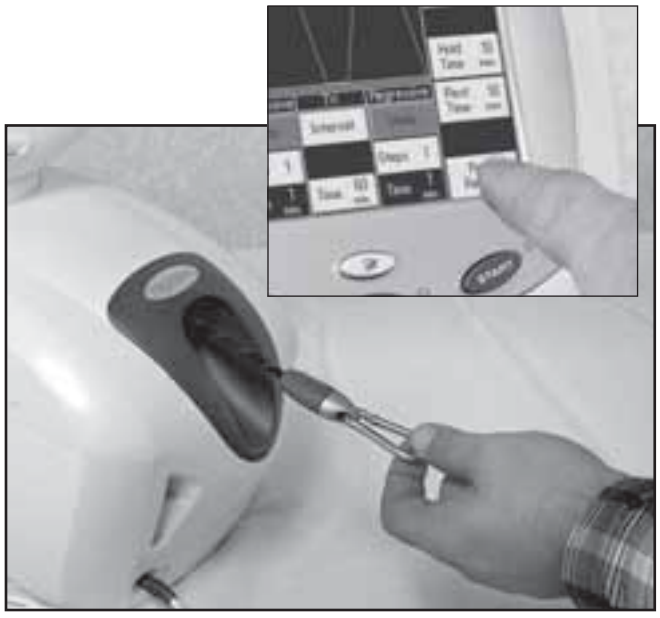


FIGURE 5.10

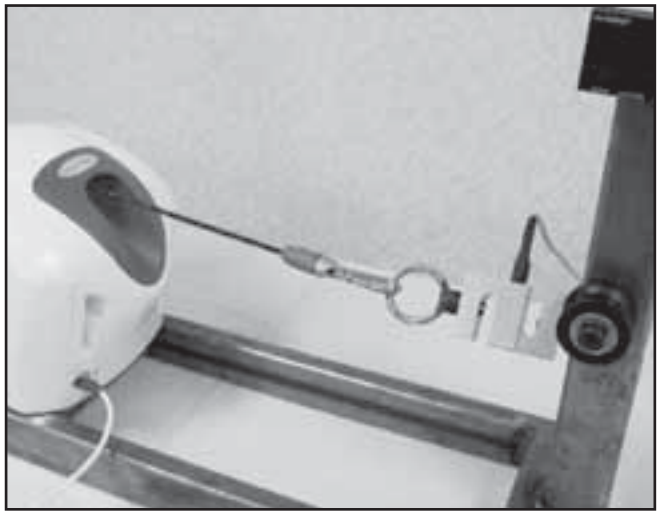


FIGURE 5.11

5.10 CORD RELEASE TROUBLESHOOTING

A. Specification

Solenoid Supply Voltage . . . . . 24 VDC ±5%

Solenoid Gear . .Properly engages Driven Gear

B. Equipment Required

1. Digital Multimeter

2. #1 Phillips Screwdriver

3. 3/32 in Allen Wrench

4. Solenoid Assembly Mounting Jig

C. Cord Release Troubleshooting Procedure

1. Solenoid Assembly

a. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.

b. Manually move solenoid shaft in and out to ensure gears are not locked and the Solenoid Shaft moves and properly engages the large Driven Gear. See Figure 5.12. If Solenoid moves and engages properly, procede to step c. below.

If Solenoid Shaft will not move or properly mesh with the Large Driven Gear, adjust Solenoid Assembly. Refer to page 46, parts A-D for adjustment. If problem persists, replace Solenoid Assembly. Refer to 6.11 Solenoid Assembly Removal & Replacement procedures.

c. With unit connected to an approved power supply and turned on, press the Rope Release on the Touch Screen. Repeat several times to ensure the solenoid properly engages and disengages the large Driven Gear.

1) Touch Screen Control does not activate Solenoid. Troubleshoot Motor Control Board. Refer to page 20 for instructions.

2) Solenoid Gear does not properly engage the large Driven Gear. See Figure 5.13. Adjust Solenoid Assembly. Refer to page 46, parts A through D for adjustment.

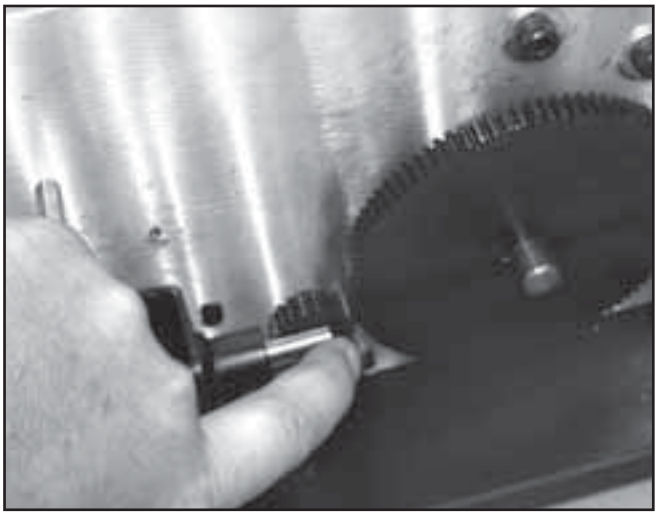


FIGURE 5.12

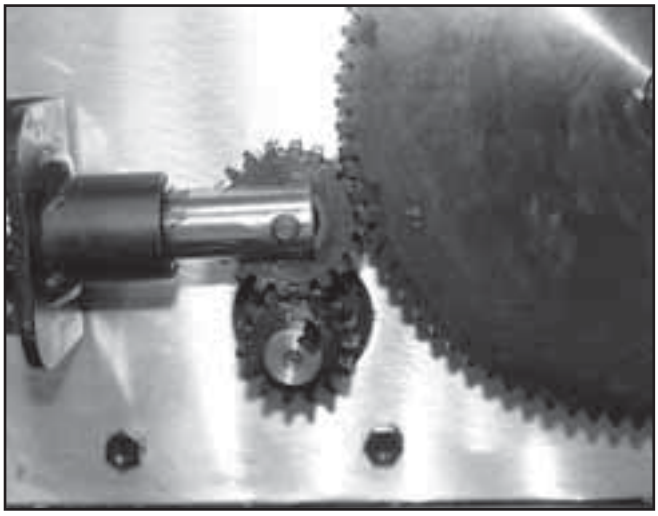


FIGURE 5.13

5.10 CORD RELEASE TROUBLESHOOTING (continued)

2. Motor Control Board

a. Disconnect Solenoid Harness from J8 on Motor Control Board. See Figure 5.14.

b. Make certain unit is connected to an approved power supply outlet and turn unit On with Power Switch.

c. Set Multimeter to read 24 VDC and connect leads to the J8 connector pins. See Figure 5.15.

d. Push and hold the Rope Release on the Touch Screen and take reading from Multimeter.

1. If no voltage is present or low voltage is present, replace Motor Control Board. Refer to 6.5 Motor Control Board Removal & Replacement.

2. If proper voltage is present and problem persists, replace Touch Screen Assembly. Refer to 6.6 Touch Screen Removal & Replacement.

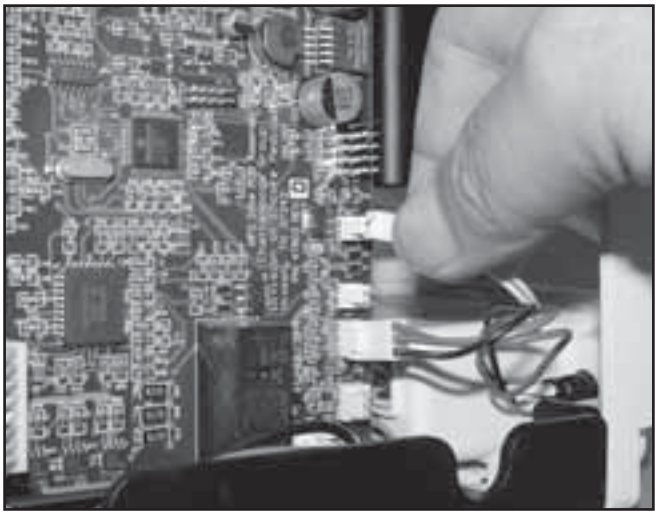


FIGURE 5.14

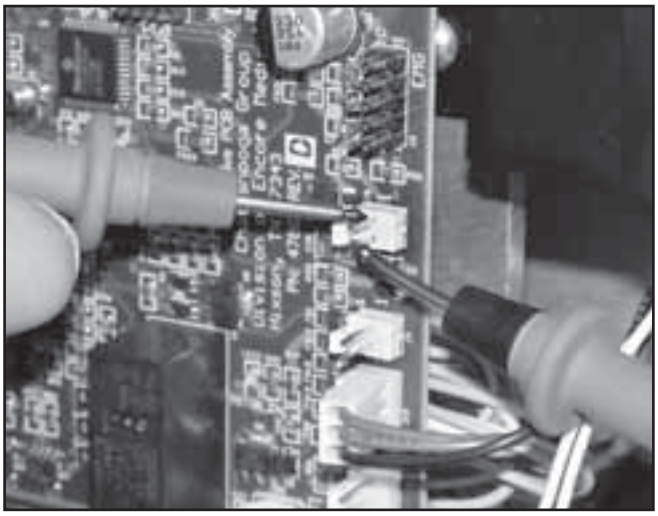


FIGURE 5.15

5.11 LOAD CELL TEST

A. Specification

Touch Screen Reading ±10%

B. Equipment Required

1. Calibration Fixture with calibrated Load Cell

C. Load Cell Test Procedure

1. Secure unit to the Calibration Fixture. See Figure 5.16.

2. Plug unit into an approved power source and turn unit On with Power Switch.

3. After unit is completely booted, Press Cord Release on the Touch Screen and pull out enough Cord to connect Cord to the Load Cell. See Figure 5.16.

4. After connecting Cord to Load Cell, allow any slack Cord back into the unit. Release the Rope Release on the Touch Screen.

5. Set up unit for a 100 lbs static pull. Refer to User Manual if necessary.

6. Zero the Load Cell according to the manufacturer's instructions.

7. Press the START button just below the Touch Screen. See Figure 5.17.

8. During the pull, compare and record the reading on the Touch Screen to the reading on the Load Cell at 25, 50, 75, and 100 lb intervals.

9. After 100 lbs has been reached, press the STOP button. See Figure 5.18. Allow unit to release the Cord.

D. Test Result

1. If reading of Load Cell is within ±10% of the Touch Screen reading, unit passed test.

2. If readings are higher or lower than the ±10% tolerance, unit failed test. Calibrate unit and re-test. Refer to Section 7 Calibration for Procedures.

3. If problem persists, perform Load Cell Troubleshooting. Refer to 5.12 Load Cell Troubleshooting for procedures.

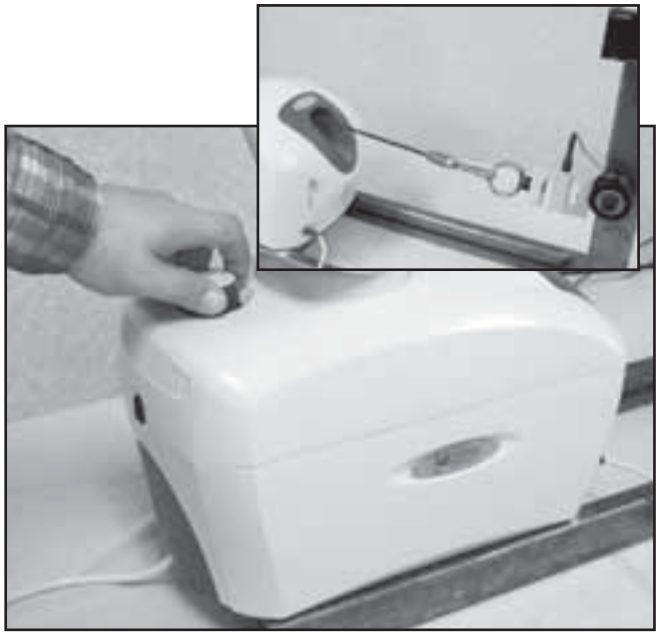


FIGURE 5.16

FIGURE 5.17

FIGURE 5.18

5.12 LOAD CELL TROUBLESHOOTING

A. Specification

Voltage to Load Cell . . . . . .10 VDC
Voltage from Load Cell . . . . . .Variable
Motor Control Board Voltage (U3). . . Variable

B. Equipment Required

1. Calibration Fixture with calibrated Load Cell
2. 3/32 in Allen Wrench
3. Digital Multimeter
4. Pick for removing wires from connectors.

C. Voltage to Load Cell Test

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Secure unit to the Calibration Fixture. See Figure 5.19.
3. Plug unit into an approved power source and turn unit On with Power Switch.
4. After unit is completely booted, press Cord Release on the Touch Screen and pull out enough Cord to connect Accessory Clip to the Load Cell. See Figure 5.19.
5. Guide any Cord slack back into unit. Release the Rope Release on the Touch Screen.
6. Remove Load Cell Connector from J11 on Motor Control Board. See Figure 5.20.
7. Set Multimeter to read 10 VDC and connect leads to Pins 1 and 2 of the J11 connector on the Motor Control Board. See Figure 5.21.
8. Multimeter should read 10 VDC.
If reading is 10 VDC, procede to step 9.
If reading is not 10 VDC, replace Motor Control Board. Refer to 6.5 Motor Control Board Removal & Replacement.
9. Reconnect Load Cell Connector to J11 on Motor Control Board. Make certain the Pink Wire on the Connector is positioned onto Pin 1 of the Motor Control Board. See Figure 5.22.
10. Set Multimeter to read 10 VDC. Make connection with Pins 1 and 2 from the side of the connector with Multimeter Leads and take reading. See Figure 5.22.
11. If reading is not 10 VDC, replace unit Load Cell. Refer to 6.7 Load Cell Removal and Replacement. If reading is 10 VDC procede to step D.

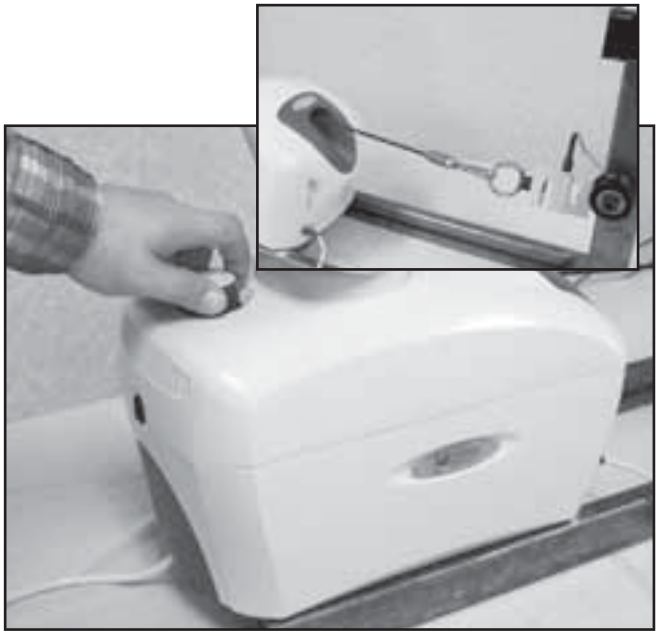


FIGURE 5.19

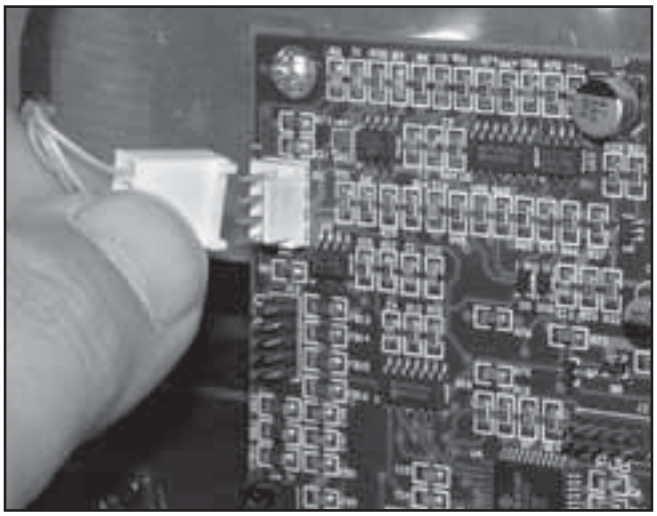


FIGURE 5.20

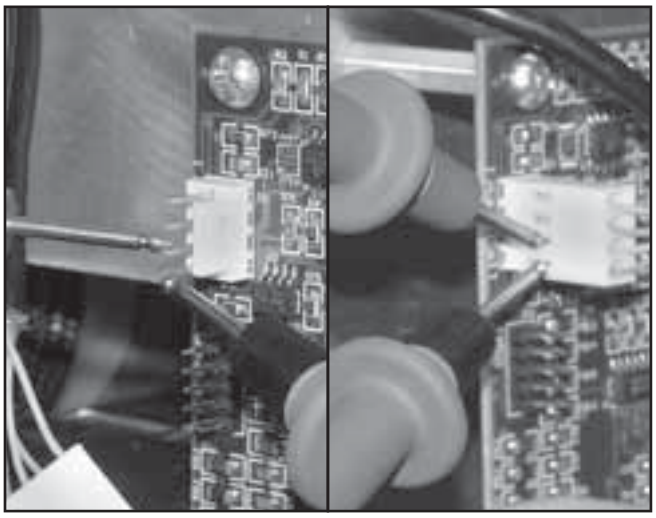


FIGURE 5.21 **FIGURE 5.22**

5.12 LOAD CELL TROUBLESHOOTING (continued)

D. Voltage from Load Cell Tests

NOTE:
It will be necessary to have two people available for the following test.

1. Set Multimeter to read 10 VDC. Make connection with Pin 3 (Blue wire) and Pin 4 (Green wire) from the side of the connector with Multimeter Leads. See Figure 5.23.
2. Press the START button. The voltage reading on Multimeter should increase as Cord Tension increases.
3. Press the STOP button. The voltage reading on Multimeter should decrease as Cord Tension decreases.
4. If voltage does not increase and decrease as described in steps 2 and 3, continue with test.
5. Turn unit Off. Using the Pick, remove Blue wire and Green wire from connector. See Figure 5.24.
6. Connect the Multimeter Leads to the Blue and Green wires. Repeat steps 2 and 3.
7. If voltage does not increase or decrease as described in steps 2 and 3, replace unit Load Cell. Refer to 6.7 Load Cell Removal and Replacement.
8. If voltage does increase and decrease as described in steps 2 and 3, replace wires into connector. Make certain the Blue wire is in the Pin 3 position and the Green wire is in the Pin 4 position. Repeat steps 2 and 3. If problem persists, proceed to step 9.
9. Locate U3 on Motor Control Board. Connect the Red (+) Multimeter Lead to Pin 7 of U3 and the Black (-) Lead to Pin 4 of U3. See Figure 5.25.
10. Repeat steps 2 and 3. If voltage does not increase and decrease as described in steps 2 and 3, replace Motor Control Board. Refer to 6.5 Motor Control Board Removal & Replacement.

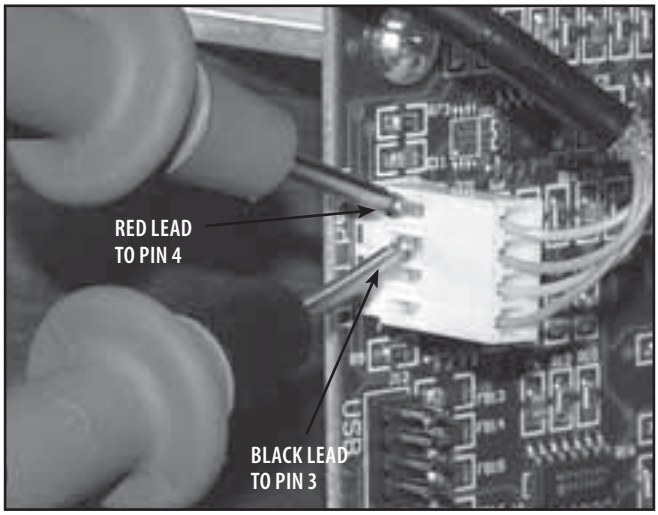


FIGURE 5.23

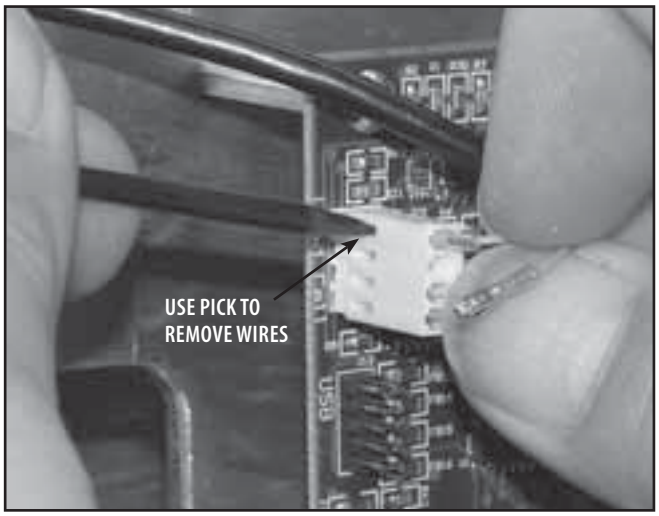


FIGURE 5.24

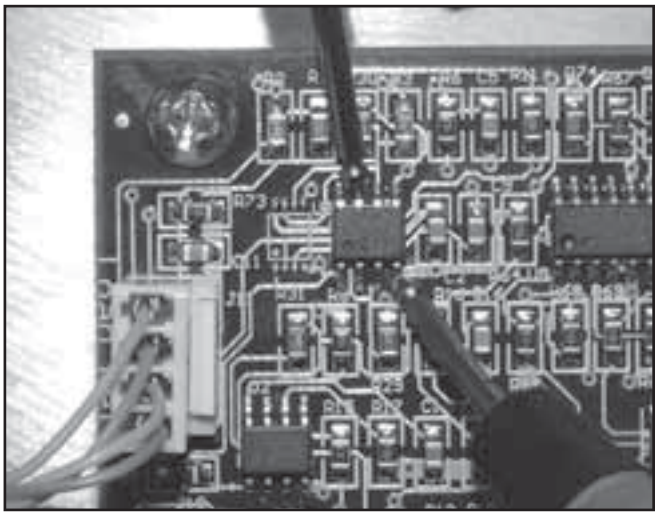


FIGURE 5.25

5.13 TOUCH SCREEN TEST

A. Specification

Contrast Control . . . . . Touch Screen Dims and Brightens

Touch Screen . . . . . Displays proper Screen

B. Equipment Required

None

C. Touch Screen Test Procedure

1. Place unit on level work surface.

2. Plug Power Cord into grounded power source with appropriate voltage. See Specifications on page 8.

3. Turn unit On with Power Switch. After the unit has completely booted, adjust the Touch Screen Contrast with the Contrast Control on the back of the Touch Screen Housing. See Figure 5.26.

4. Press Touch Screen controls to verify the Touch Screen responds and displays the correct screen. See Figure 5.27.

D. Test Result

1. If when adjusting, Contrast Control dims and brightens Touch Screen, unit passed test. If Contrast Control does not dim and brighten Touch Screen, refer to 5.14 Touch Screen Troubleshooting.

2. If when pressing controls on Touch Screen the proper screen does not display, unit failed test. Calibrate Touch Screen. Refer to 7.2 Touch Screen Calibration.

3. If nothing is visible on Touch Screen, adjust Contrast Control. If problem persists, unit failed test. Refer to 5.14 Touch Screen Troubleshooting.

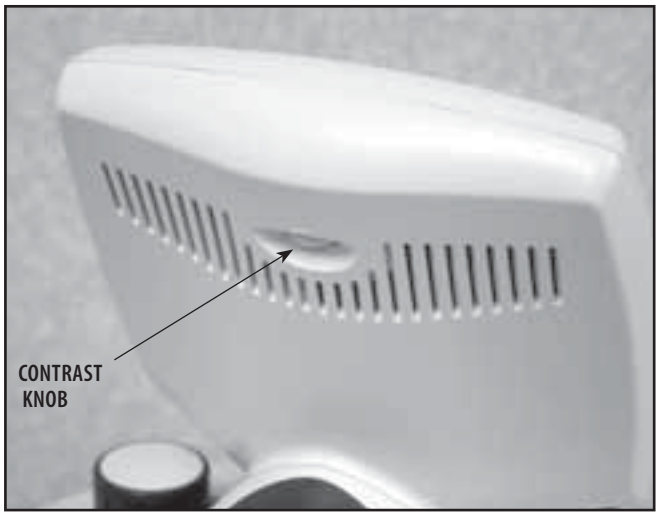


FIGURE 5.26

FIGURE 5.27

5.14 TOUCH SCREEN TROUBLESHOOTING

A. Specification

Voltage to Touch Screen:

J6 Connector . . . . . 5 VDC ±5%

Display Connector. . . . . .24 VDC ±5%

B. Equipment Required

1. 3/32 in Allen Wrench

2. Digital Multimeter

C. Touch Screen Troubleshooting Procedure

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.

2. Plug unit into an approved power source and turn unit On with Power Switch.

3. Observe Motor Control Board LEDs. The "5V OK" LED should be illuminated and LED 3 should be flashing. See Figure 5.28.

a. If LEDs are not working properly, proceed to step 4.

b. If LEDs are working properly, proceed to steps 5 through 9.

4. Turn unit Off. Remove Touch Screen Ribbon Cable from "Display" on Motor Control Board. See Figure 5.29. Turn unit On.

a. If LEDs begin working properly, replace Touch Screen assembly. Refer to 6.6 Touch Screen Assembly Removal and Replacement.

b. If LEDs are not working properly, refer to 5.15 Power Supply Troubleshooting.

c. If Power Supply is functioning properly, replace Motor Control Board. Refer to 6.5 Motor Control Board Removal and Replacement.

5. Turn unit Off. Remove Touch Screen Ribbon Cable from "Display" on Motor Control Board. See Figure 5.29. Turn unit On.

6. Set Multimeter to VDC. On Connector J6, connect the Red (+) Multimeter Lead to Pin 1 and the Black (-) Lead to Pin 2. See Figure 5.28. Take reading from Multimeter. Reading should be +5 VDC.

7. Connect the Red (+) Multimeter Lead to Pin 6 and the Black (-) Lead to Pin 1 on the Motor Control Board "Display" Connector. See Figure 5.30 reading on Multimeter should be 24 VDC.

8. If the voltage reads correctly from steps 5 and 6, replace the Touch Screen Assembly. Refer to 6.6 Touch Screen Removal and Replacement.

9. If either of the voltages are not reading properly as in steps 6 and 7, replace Motor Control Board. Refer to 6.5 Motor Control Board Removal & Replacement.

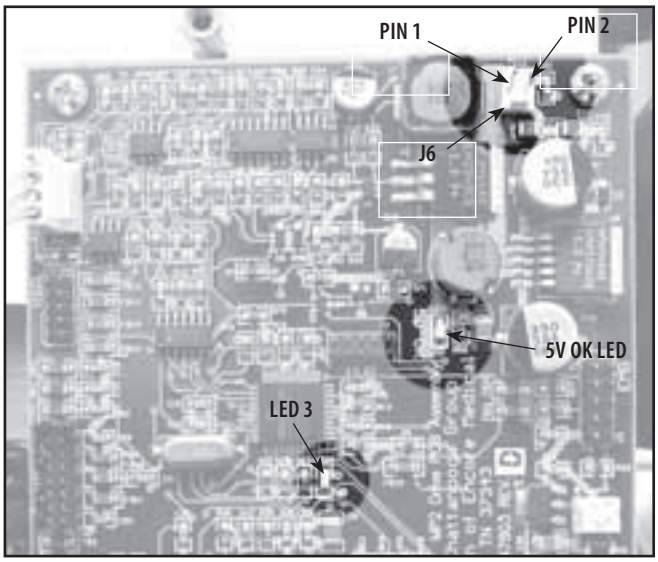


FIGURE 5.28

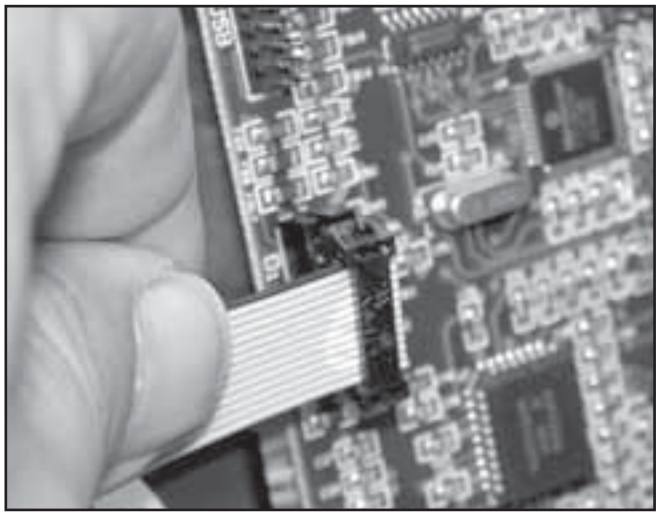


FIGURE 5.29

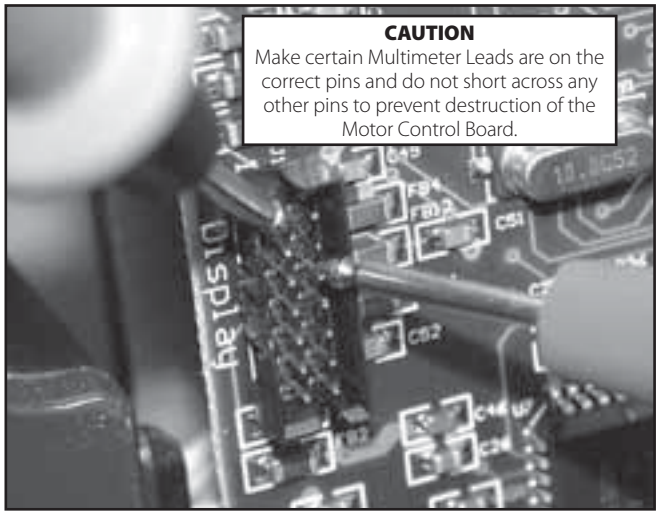

CAUTION
Make certain Multimeter Leads are on the correct pins and do not short across any other pins to prevent destruction of the Motor Control Board.

FIGURE 5.30

5.15 POWER SUPPLY TROUBLESHOOTING

A. Specification

Power Supply Input . . 100 V-240 V (50/60 Hz)

Power Supply Output . . . . . .24 VDC ±5%

B. Equipment Required

1. 3/32 in Allen Wrench

2. Digital Multimeter

C. Power Supply Troubleshooting Procedure

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.

2. Plug Power Cord into grounded power source with appropriate voltage. See Specifications on page 8.

3. Set Multimeter to read appropriate VAC.

4. Connect Multimeter Leads to the Power Supply Fuses at the rear of Power Supply. See Figure 5.31. Multimeter should read same voltage as the approved power source.

a. If reading is the same as approved power source, proceed to step 5.

b. If VAC reading is not the same as approved power source, replace Power Supply. Refer to 6.12 Power Supply Removal & Replacement.

5. Remove Power Supply Output Harness from Motor Control Board J5. See Figure 5.32.

6. Set Multimeter to read VDC. Connect Multimeter Leads to the Power Supply Output Harness. See Figure 5.33. Multimeter reading should be 24 VDC ±5%.

a. If reading is within the specified range as stated above, unit passed test.

b. If reading is not within the specified range as stated above, replace Power Supply. Refer to 6.12 Power Supply Removal & Replacement.

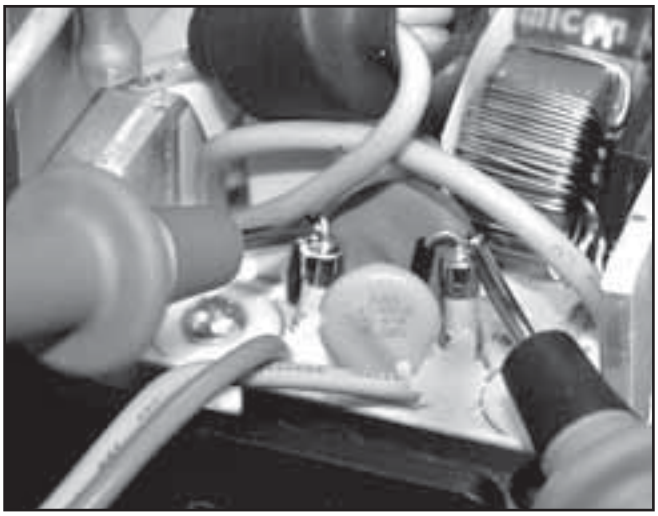


FIGURE 5.31

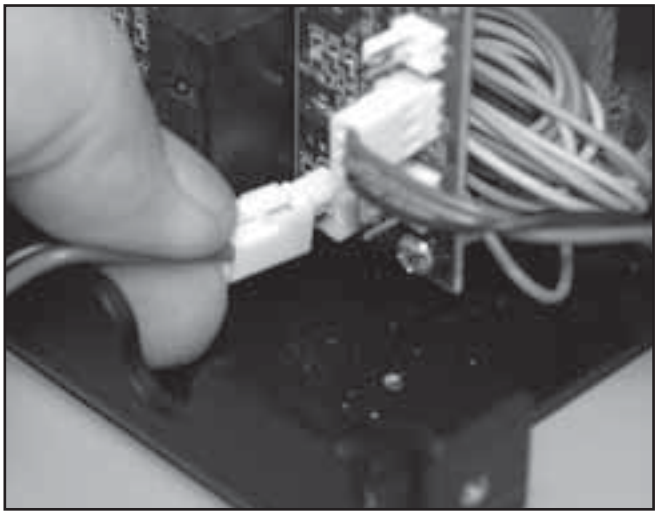


FIGURE 5.32

FIGURE 5.33

6- REMOVAL & REPLACEMENT

6.1 SIDE COVER REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Side Cover (2 Req'd) 47857

B. Equipment Required

- 3/32 in Allen Wrench
- Flat Blade Screwdriver
- #1 Phillips Screwdriver

C. Removal of Side Covers

1. Remove Patient Interrupt Switch Hook Screw Cover with a Flat Blade Screwdriver. See inset at Figure 6.1.
2. Remove Patient Interrupt Switch Hook Screw using a #1 Phillips Screwdriver. See Figure 6.1.
3. Lay unit on its side on a clean, soft work surface.
4. Using the 3/32 in Allen Wrench, remove the three Side Cover Mounting Screws from the bottom of the unit. See Figure 6.2.
5. Slide side cover from under Top Cover.
6. Turn unit over onto opposite side and repeat steps 2-5.

D. Replacement of Side Covers

1. Position Side Cover Top Mounting Tab between plastic of Top Cover and Touch Screen Mounting Plate. See Figure 6.3.
2. Slide cover into position and secure with three socket head screws using the 3/32 in Allen Wrench. Refer to Figure 6.2.

NOTE:
Do not overtighten mounting screws.

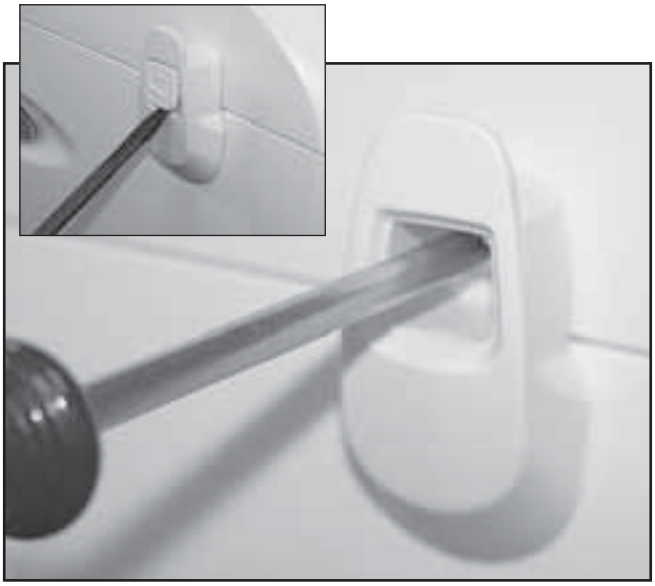


FIGURE 6.1

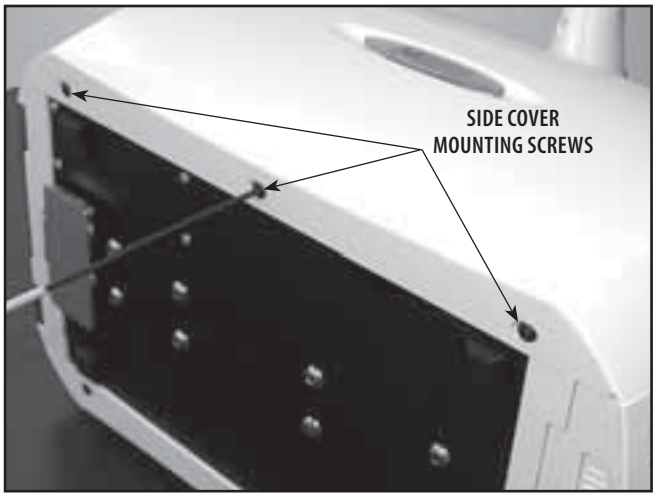


FIGURE 6.2

FIGURE 6.3

6.2 TOP AND CORD GUIDE COVER REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

- **Top Cover** 47856
- **Cord Guide Cover** 47872

B. Equipment Required

- 3/32 in Allen Wrench
- #2 Phillips Screwdriver
- Touch Screen to Cover Assembly Jig

C. Removal of Top and Cord Guide Covers

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Position unit upright on base and untie Traction Cord from Knuckle. Refer to page 41, step 11 Traction Cord Removal & Replacement.
3. Disconnect the Touch Screen Ribbon Cable from the Motor Control Board. See Figure 6.4.
4. Using the #1 Phillips Screwdriver, remove the two Top Cover Mounting Screws from each side of the unit. See Figure 6.5.

NOTE:
To remove the Touch Screen Assembly from the Top Cover refer to 6.6 Touch Screen Removal & Replacement.

5. Carefully lift the Top Cover away from unit and position into Touch Screen to Cover Assembly Jig. See Figure 6.6.
6. Using the #2 Phillips Screwdriver, remove the four Cord Guide Cover Mounting Screws. See Figure 6.6.

D. Replacing Top and Cord Guide Covers

1. With Top Cover positioned onto the Touch Screen to Cover Assembly Jig, place the Cord Guide Cover into position. Secure with the four Cord Guide Cover Mounting Screws. See Figure 6.6.
2. Position the Top Cover Assembly onto the unit chassis. Secure into position on the standoffs with the four Top Cover Mounting Screws (two on each side). See Figure 6.5.
3. Connect the Touch Screen Ribbon Cable to the "Display" Connector on the Motor Control Board. See Figure 6.4.
4. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.

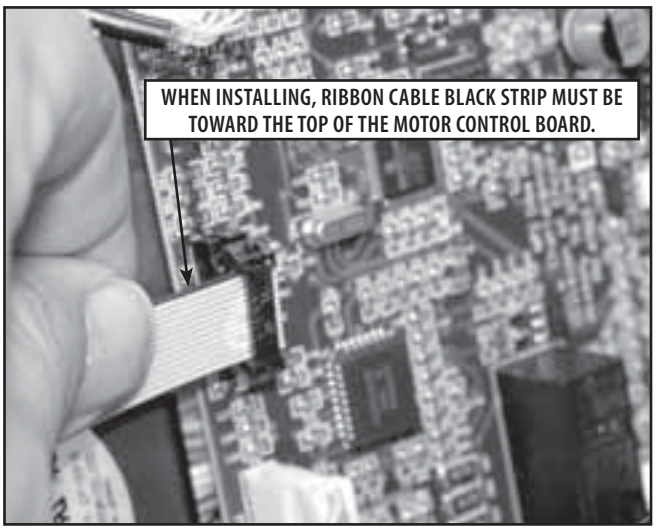


FIGURE 6.4

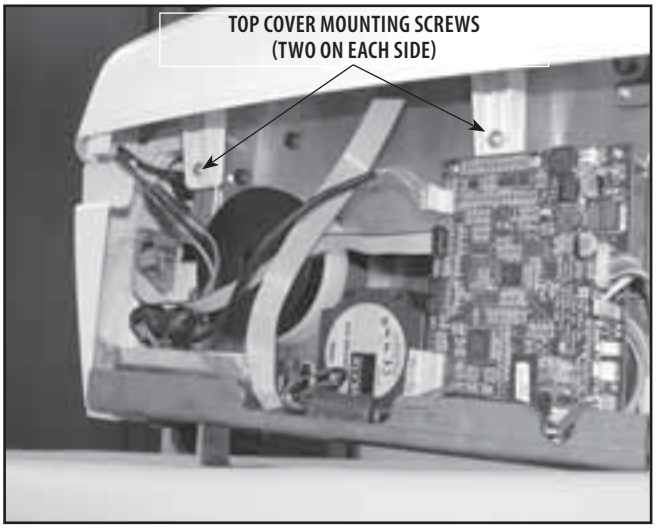


FIGURE 6.5

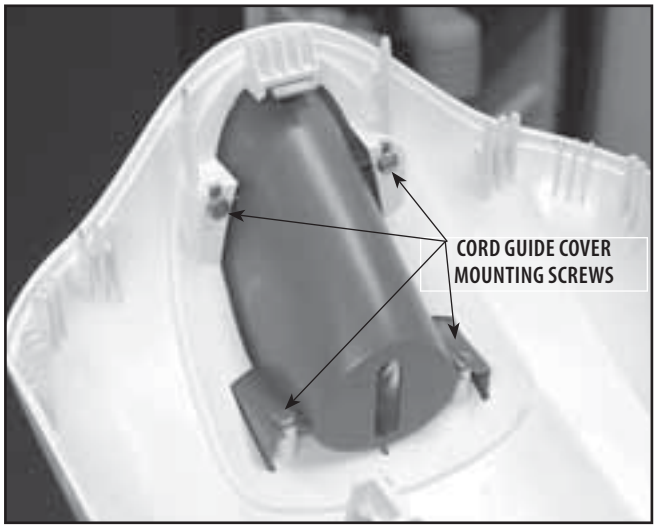


FIGURE 6.6

6.3 REAR COVER REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Rear Cover Assembly 48110

B. Equipment Required

- 3/32 in Allen Wrench
- Touch Screen to Cover Assembly Jig

C. Removal of Top and Cord Guide Covers

1. Remove IEC Connector Cover. See Figure 6.7.
2. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
3. Remove Top Cover Assembly. Refer to 6.2, part C, steps 1-5.
4. Using the 3/32 in Allen Wrench, remove the four Rear Cover Mounting Screws. See Figure 6.8.

NOTE:
To replace the Rear Cover with a new part, remove the Power Switch, Mains Connector, and USB Board from the old Rear Cover for re-installation onto the new part. See Figure 6.9.

It is not necessary to remove Harnesses from Power Switch, Mains Connector, or USB Board unless these components are to be replaced.

D. Replacing Rear Cover

1. Replace existing Rear Cover

a. Secure Rear Cover to chassis with four Rear Cover Mounting Screws. See Figure 6.8.

b. Install Top Cover Assembly. Refer to 6.2, part D, steps 2 and 3.

c. Install Side Covers. Refer to 6.1, part D, steps 1 and 2.

2. Replace with new Rear Cover

a. Install existing Power Switch, Mains Connector, and USB Board to new Rear Cover.

b. Secure Rear Cover to chassis. See Figure 6.8.

c. Install Top Cover Assembly. Refer to 6.2, part D, steps 2 and 3.

d. Install Side Covers. Refer to 6.1, part D, steps 1 and 2.

NOTE:
Do not overtighten mounting screws.

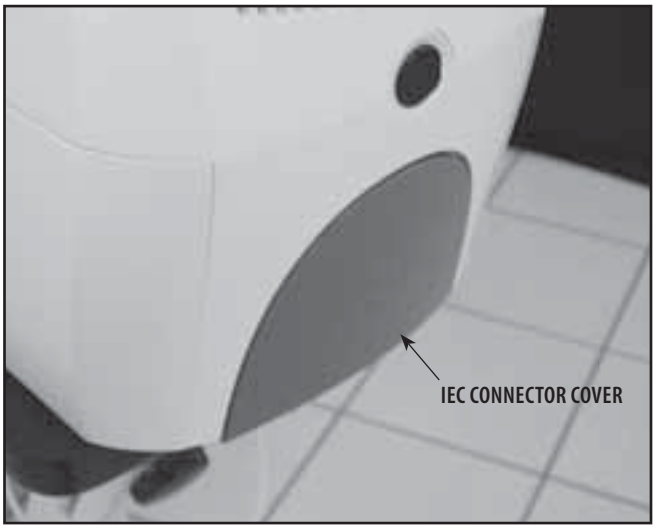


FIGURE 6.7

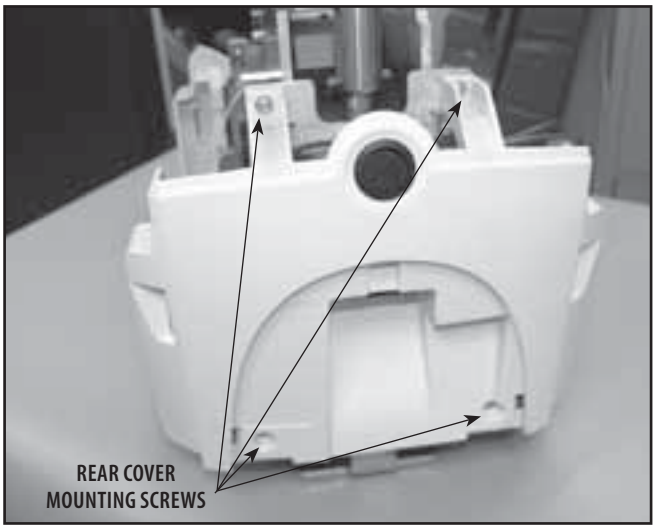


FIGURE 6.8

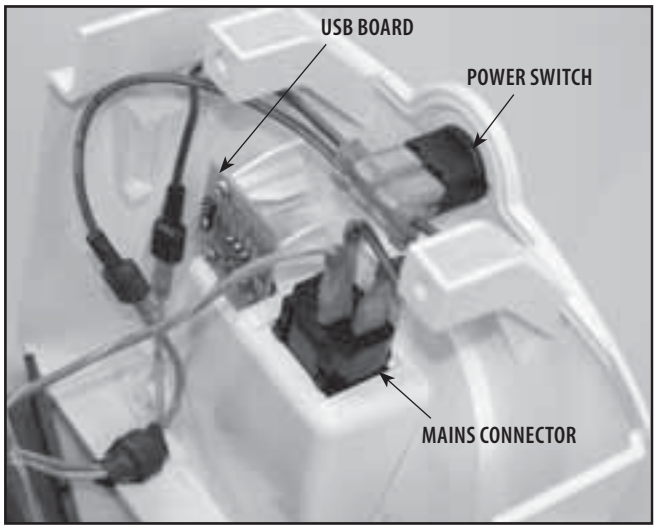


FIGURE 6.9

6.4 FRONT COVER REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Front Cover 47858

B. Equipment Required

- 3/32 in Allen Wrench
- Touch Screen to Cover Assembly Jig
- Needle Nose Pliers

C. Removal of Front Cover

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Remove Top Cover Assembly. Refer to 6.2, part C, steps 2-5.
3. Disconnect the Patient Interrupt Switch Jack from the Motor Control Board. See Figure 6.10.
4. Using the 3/32 in Allen Wrench, remove the four Front Cover Mounting Screws. See Figure 6.11.

NOTE:
To replace the Front Cover with a new part, remove the Patient Interrupt Switch Jack from the old Front Cover for re-installation onto the new part. See Figure 6.12.

D. Replacing Front Cover

1. Replacing existing Front Cover

a. Connect Patient Interrupt Switch Jack to the Motor Control Board. See Figure 6.10.

b. Secure the Front Cover to the chassis with the four Front Cover Mounting Screws. See Figure 6.11.

c. Install Top Cover Assembly. Refer to 6.2, part D, steps 2 and 3.

d. Install Side Covers. Refer to 6.1, part D, steps 1 and 2.

2. Replacing with new Front Cover

a. Install Patient Interrupt Switch Jack into new Front Cover. See Figure 6.12.

b. Perform steps 3-4 above in reverse order.

c. Install Top Cover Assembly. Refer to 6.2, part D, steps 2 and 3.

d. Install Side Covers. Refer to 6.1, part D, steps 1 and 2.

NOTE:
Do not overtighten mounting screws.

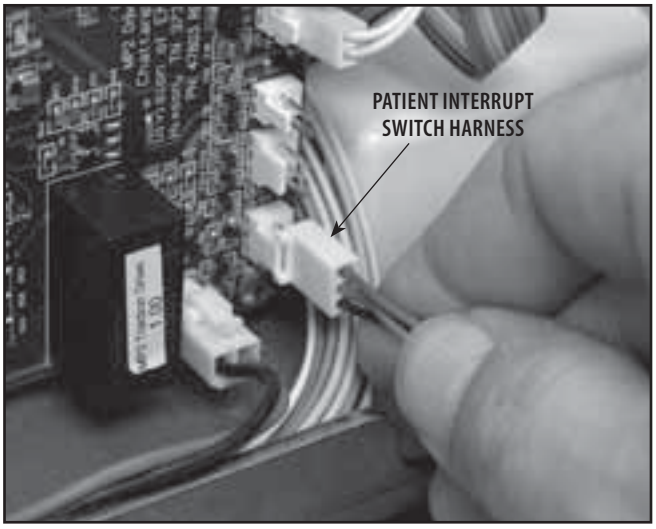


FIGURE 6.10

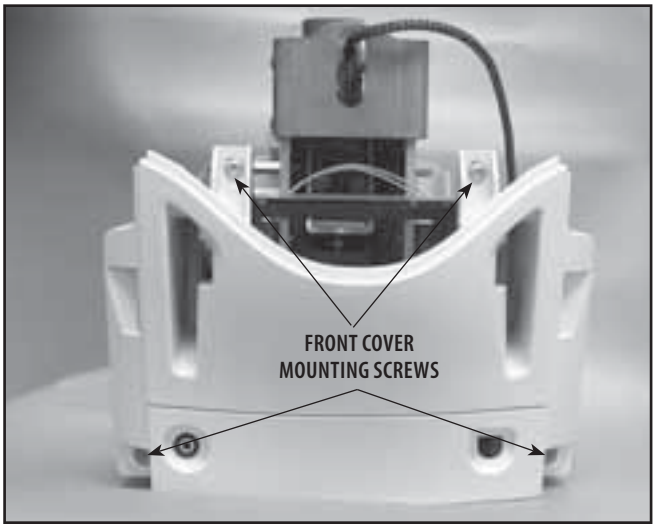


FIGURE 6.11

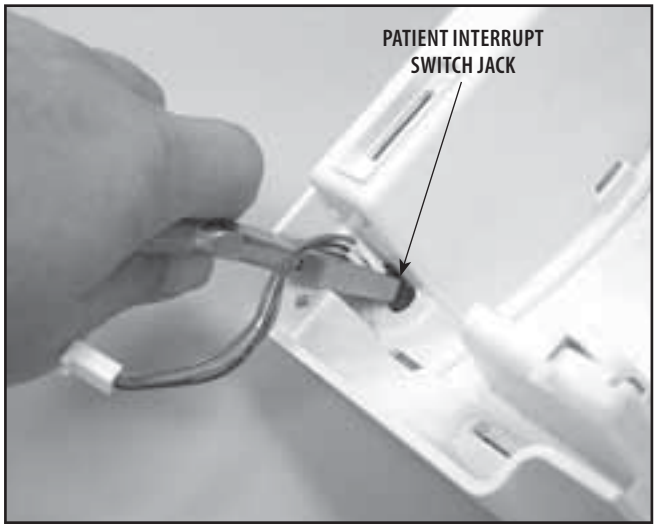


FIGURE 6.12

⚠ WARNING

The remaining removal and replacement procedures in this section require that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT AFTER SUCCESSFUL CALIBRATION

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

6.5 MOTOR CONTROL BOARD REMOVAL & REPLACEMENT

WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Motor Control Board 47803

B. Equipment Required

- 3/32 in Allen Wrench
- #2 Phillips Screwdriver

C. Removal of Motor Control Board

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Disconnect all seven harnesses from the Motor Control Board. See Figure 6.13.
3. Using the #2 Phillips Screwdriver, remove the four Motor Control Board Mounting Screws. See Figure 6.14.

D. Replacing Motor Control Board

1. Position Motor Control Board over chassis standoffs and secure into position with the screws removed in step 3 above.
2. Install Harnesses to the Motor Control Board. See Figure 6.13.
3. Perform complete Calibration and Burn In of unit.

NOTE:
Do not overtighten mounting screws.

WARNING

This component removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

COMPLETE CALIBRATION OF UNIT- Refer to Section 7
AND
MINIMUM OF 2 HOUR BURN IN OF UNIT AFTER SUCCESSFUL CALIBRATION- Refer to Section 7

Failure to perform either of these procedures, after a component or assembly replacement will void warranty and may result in injury to patients and/or severe equipment damage.

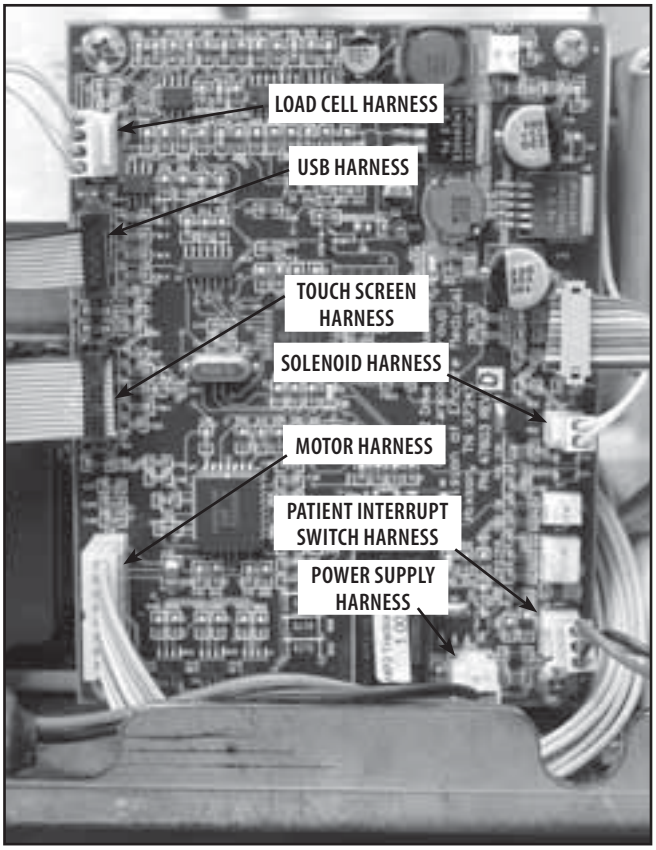


FIGURE 6.13

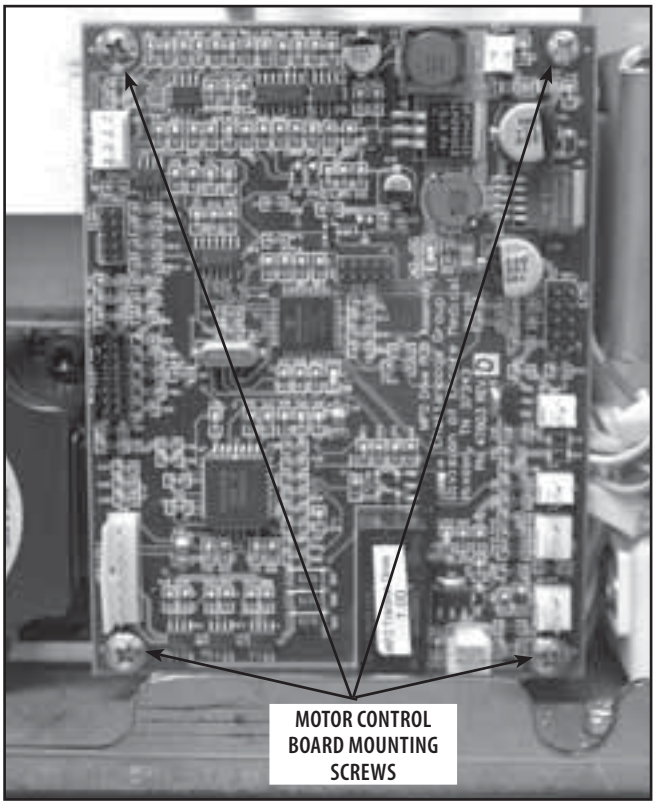


FIGURE 6.14

6.6 TOUCH SCREEEN ASSEMBLY REMOVAL & REPLACEMENT

WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Touch Screen Assembly 48063

B. Equipment Required

- 3/32 in Allen Wrench
- Flat Blade Screwdriver
- Touch Screen to Cover Assembly Jig

C. Removal of Touch Screen Assembly

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Remove the Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement, part C, steps 2-5.
3. Using the Flat Blade Screwdriver, remove the four Top Moulding Plate Mounting Screws. When removing the Top Moulding Plate, guide the Touch Screen Ribbon Cable through the opening. See Figure 6.15.
4. Using the Flat Blade Screwdriver, remove the four Turn Table Plate Retaining Screws. See Figure 6.16.
5. Squeeze the two Touch Screen Assembly Tabs and push the Touch Screen Assembly out of the Top Cover. See Figure 6.17.

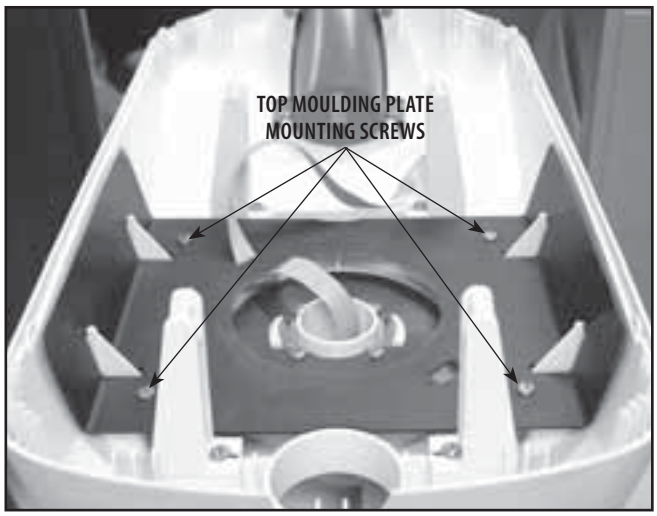


FIGURE 6.15

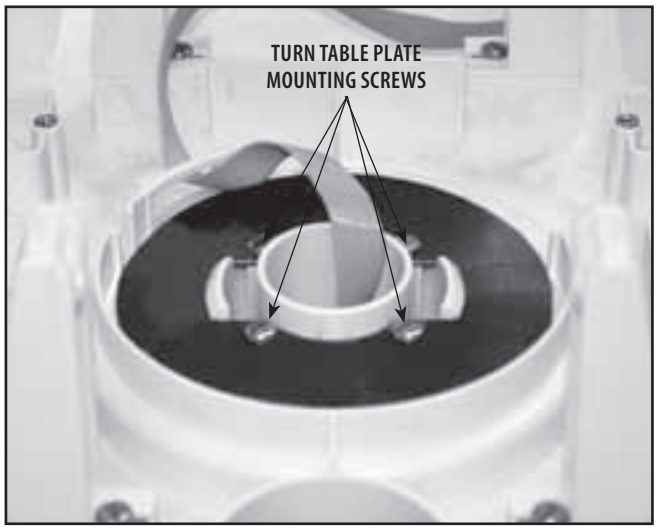


FIGURE 6.16

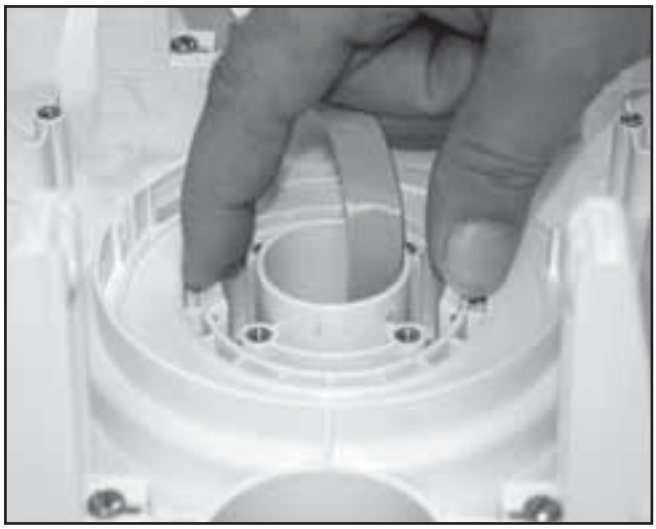


FIGURE 6.17

6.6 TOUCH SCREEN ASSEMBLY REMOVAL & REPLACEMENT (continued)

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

D. Replacing Touch Screen Assembly

1. Place new Touch Screen Assembly into Touch Screen to Cover Assembly Jig.
2. Position Top Cover over the Touch Screen Assembly aligning the mounting hole to the Touch Screen Assembly.
3. Slide the Top Cover over the Touch Screen Assembly until the Mounting Tabs click into position. See Figure 6.18.
4. Position the Turntable Plate and secure the four screws with the #2 Phillips Screwdriver. See Figure 6.19.
5. Position the Top Moulding Plate. Thread the Touch Screen Ribbon Cable through the opening in the Top Moulding Plate as shown in Figure 6.20. Secure the four Top Moulding Plate screws with the #2 Phillips Screwdriver. Refer to Figure 6.15.
6. Install Top Cover Assembly. Refer to 6.2, part D, steps 2 and 3.
7. Install Side Covers. Refer to 6.1, part D, steps 1 and 2.
8. Perform complete Calibration and Burn In of unit.

NOTE:
Do not overtighten mounting screws.

⚠ WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT
AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

FIGURE 6.18

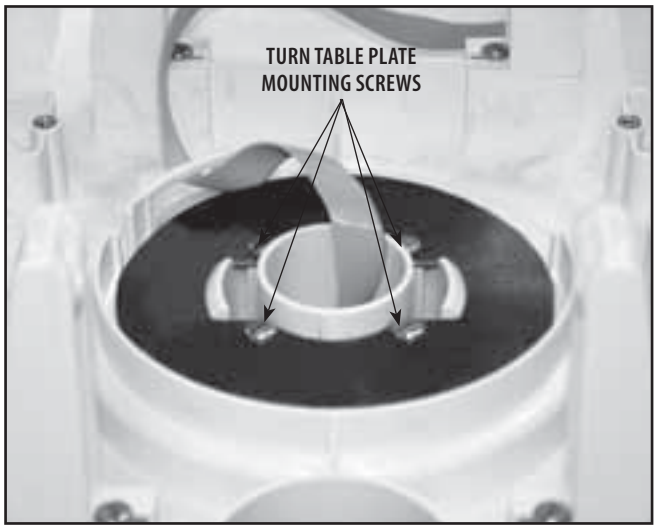


FIGURE 6.19

FIGURE 6.20

6.7 LOAD CELL ASSEMBLY REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Load Cell Assembly. 48009

B. Equipment Required

- 3/32 in Allen Wrench
- 4 mm Hex Key Socket and Ratchet
- Calibrated Torque Wrench- 200 inch pound or 2,500 Newton meter minimum capacity.

C. Removal of Load Cell Assembly

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Remove the Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement, part C, steps 2-5.
3. Remove Rear Cover. Refer to 6.3 Rear Cover Removal & Replacement.
4. Remove the Clamp Spring Assembly. Refer to 6.8 Clamp Spring Assembly Removal & Replacement.
5. Disconnect the Load Cell Harness from the Motor Control Board. See Figure 6.21.
6. Using the 4 mm Hex Key Socket and Ratchet, remove the two Load Cell Mounting Screws and Flat Washers from each side of the Chassis. See Figure 6.22.
7. Lift Load Cell Assembly out of Chassis. See Figure 6.23.

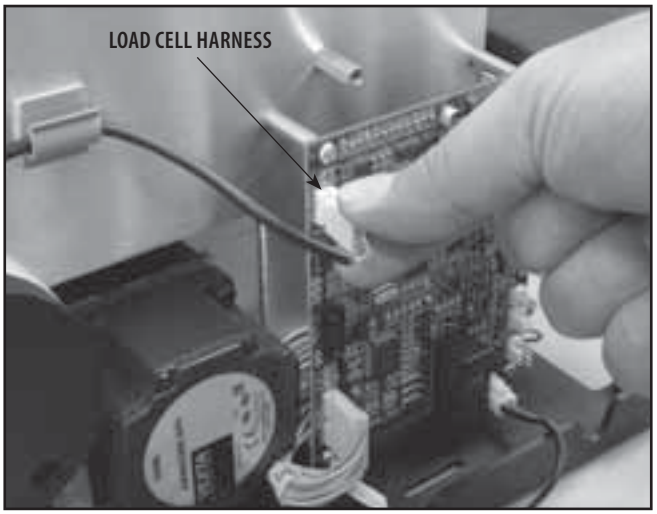


FIGURE 6.21

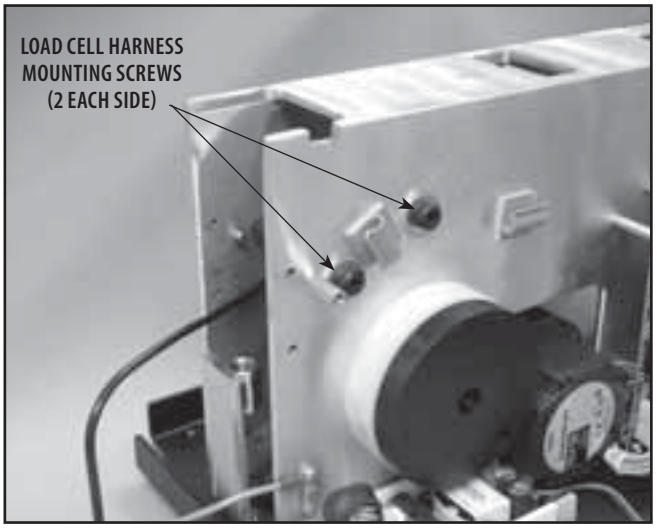


FIGURE 6.22

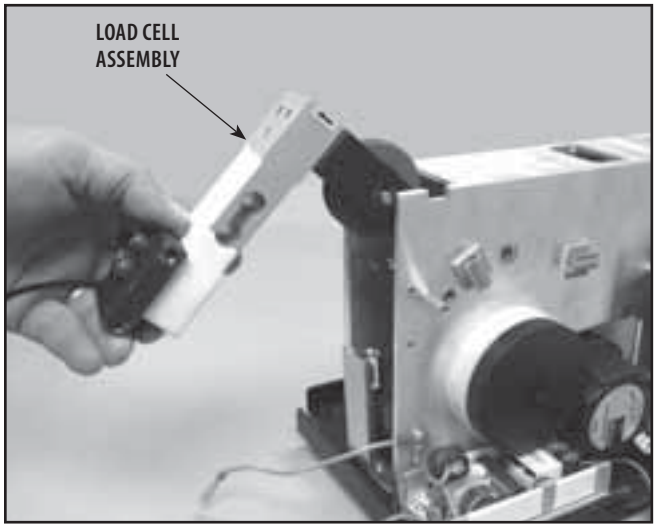


FIGURE 6.23

6.7 LOAD CELL ASSEMBLY REMOVAL & REPLACEMENT (continued)

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

D. Replacement of Load Cell Assembly

1. Place Load Cell Assembly into Chassis and hold in position while hand starting the Load Cell Mounting Screws and Flat Washers. See Figure 6.24.
2. Hand tighten the Load Cell Mounting Screws.
3. Install the Clamp Spring Assembly. Refer to 6.8 Clamp Spring Assembly Removal & Replacement.
4. Use the Torque Wrench and 4 mm Hex Key Socket to torque the Load Cell Mounting Screws to 35 Nm (84 in lbs).
5. Route Load Cell Harness through Harness Clips on the Chassis and connect to Motor Control Board. See Figure 6.25.
6. Route Traction Cord through the Load Cell Assembly Pulley and through the Chassis Upper Guide Pulley. See Figure 6.26.
7. Install Rear Cover. Refer to 6.3 Rear Cover Removal & Replacement.
8. Install Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement.
9. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
10. Perform complete Calibration and Burn In of unit.

⚠ WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

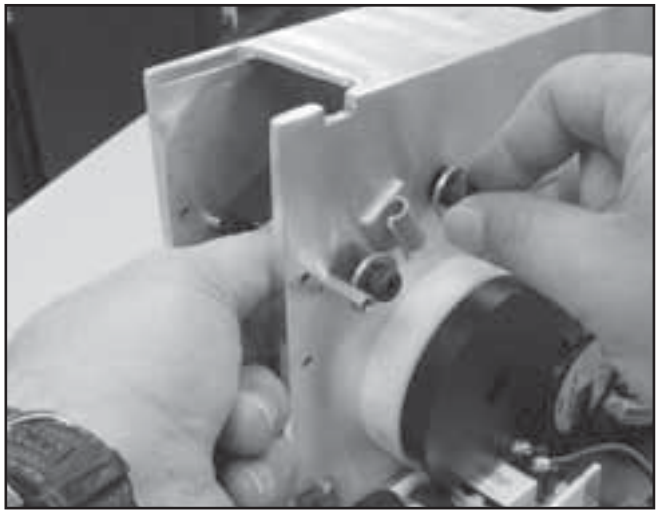


FIGURE 6.24

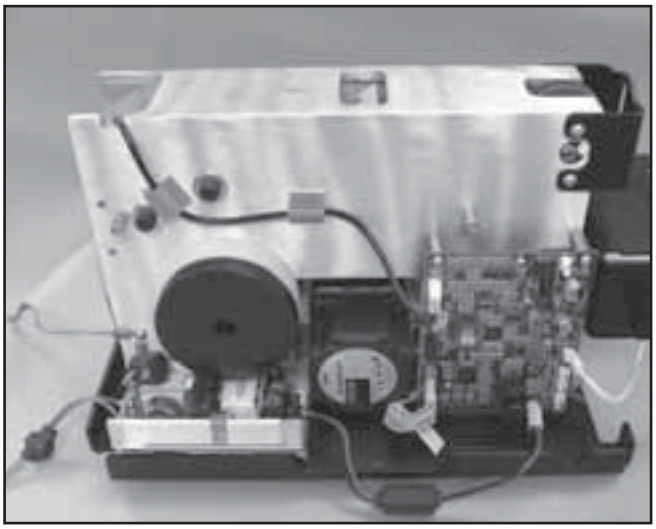


FIGURE 6.25

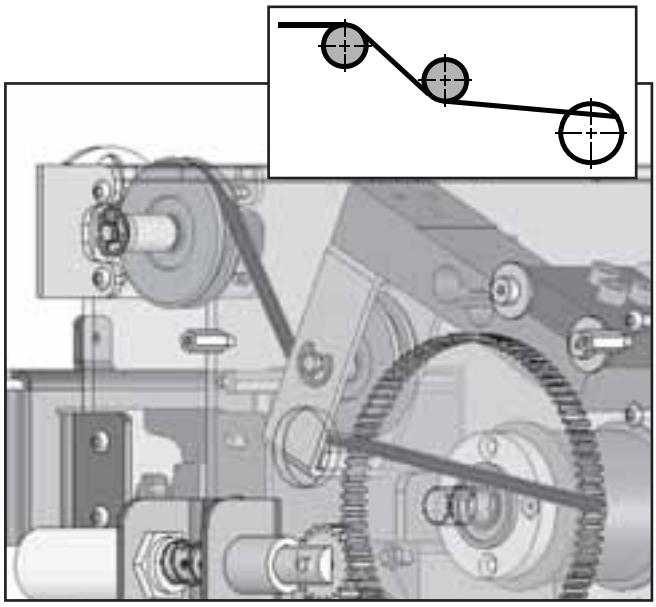


FIGURE 6.26

6.8 CLAMP SPRING ASSEMBLY REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Clamp Spring Assembly 48023

B. Equipment Required

3/32 in Allen Wrench

C. Clamp Spring Assembly Removal

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Remove the Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement, part C, steps 2-5.
3. Remove Rear Cover. Refer to 6.3 Rear Cover Removal & Replacement.
4. Remove the four Clamp Spring Assembly Mounting Screws. See Figure 6.27.
5. Turn the Clamp Knob Counterclockwise until it is completely disengaged from the Clamp Plate. See Figure 6.28.

D. Clamp Spring Assembly Replacement

1. Position the Clamp Spring Assembly at the Chassis and rotate Clamp Knob until the threaded portion is fully engaged in the Clamp Plate and the Clamp Spring Assembly Mounting Bracket is aligned with the respective mounting holes in the Chassis. Secure with the four Clamp Spring Assembly Mounting Screws.
2. Install Rear Cover. Refer to 6.3 Rear Cover Removal & Replacement.
3. Install Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement.
4. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
5. Perform complete Calibration and Burn In of unit.

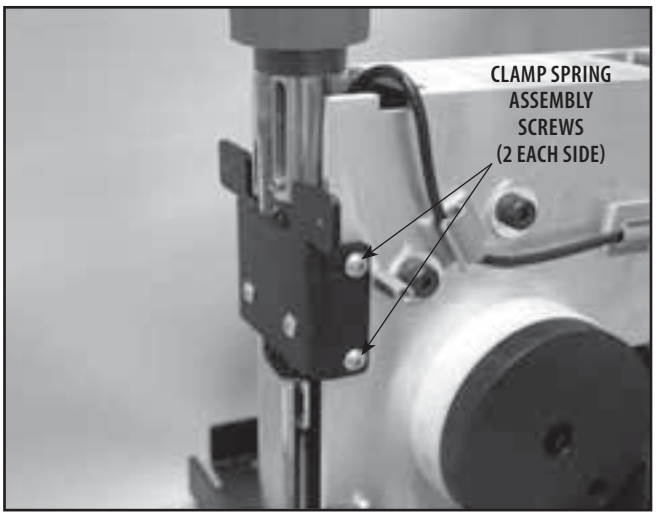


FIGURE 6.27

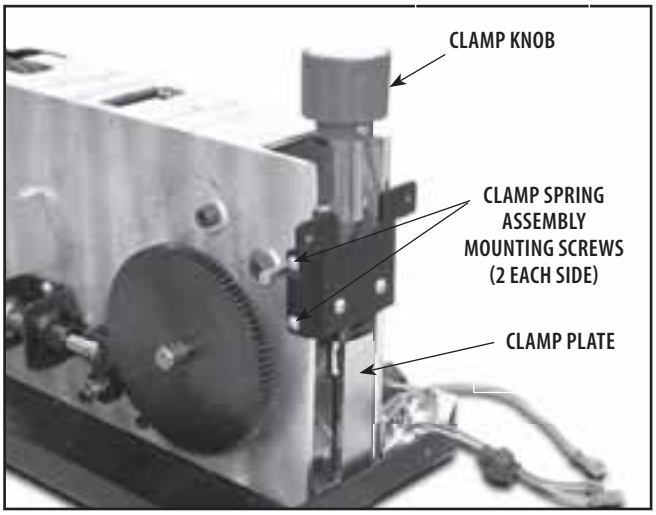


FIGURE 6.28

⚠ WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT
AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

6.9 TRACTION CORD REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Traction Cord 48031

B. Equipment Required

- 3/32 in Allen Wrench
- 5/32 in Allen Wrench
- Needle Nose Pliers
- Tape Measure

C. Clamp Spring Assembly Removal

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Remove the Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement, part C, steps 2-5.
3. Remove Rear Cover. Refer to 6.3 Rear Cover Removal & Replacement.
4. Remove the Clamp Spring Assembly. Refer to 6.8 Clamp Spring Removal and Replacement.
5. While holding the Cord Tension Spring Housing in position with one hand, loosen the retaining screw with the other hand. See Figure 6.29.
6. Gradually release the spring tension by allowing the Spring Housing to slowly rotate in the hand. Leave the Housing Retaining Screw loose.
7. Manually release the Solenoid from the Large Driven Gear and simultaneously pull the Traction Cord through the unit front until the Traction Cord stops. See Figure 6.30.

NOTE:
Make certain the Traction Cord Knot is facing the rear of the unit.

8. Release the Solenoid, making certain it fully engages the teeth of the Large Driven Gear.

NOTE:
It may be necessary to slightly jog the Large Driven Gear to facilitate tooth engagement.

9. Remove the Traction Cord Knuckle. Refer to page 41, step 11. Using the Needle Nose Pliers, pull the Traction Cord Knot from the Traction Cord Spool and completely pull the Traction Cord out of unit. See Figure 6.31.

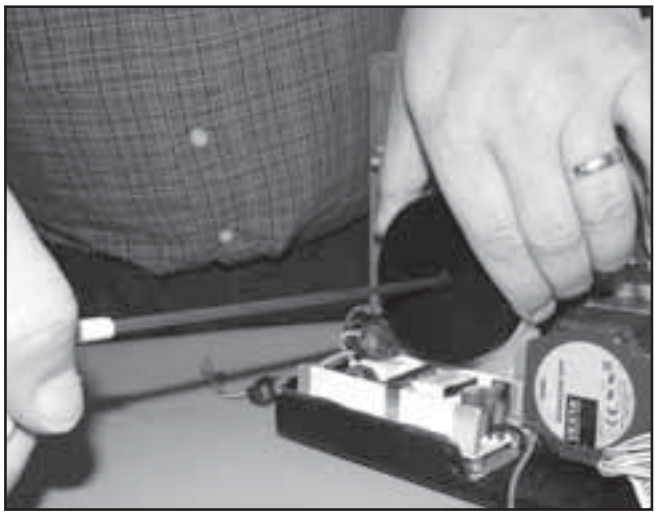


FIGURE 6.29

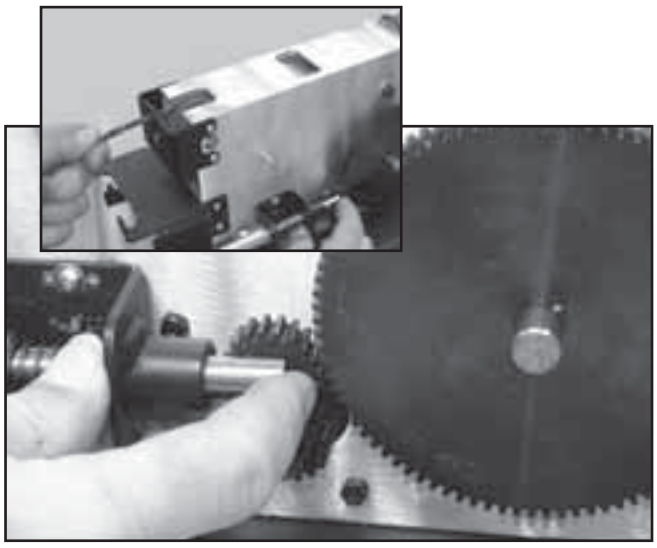


FIGURE 6.30

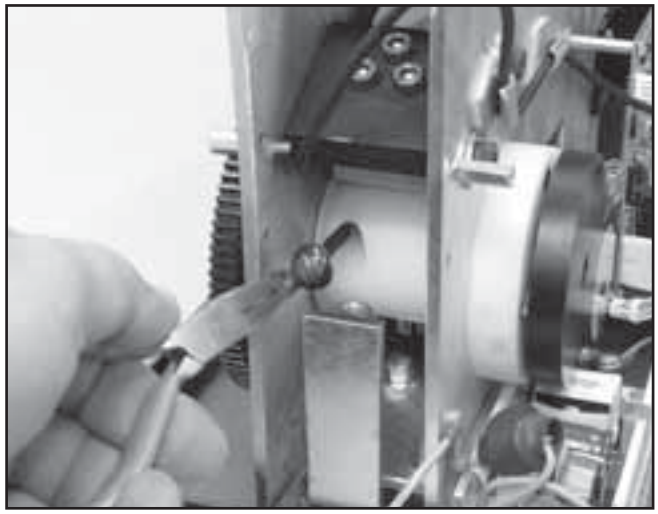


FIGURE 6.31

6.9 TRACTION CORD REMOVAL & REPLACEMENT (continued)

⚠ WARNING

- Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.
- It is not recommend tying a new knot in a cord that has frayed or failed in use or is worn in an area from constant use. The cord must be replaced.

D. Traction Cord Replacement

1. Route Traction Cord through the Traction Cord Spool, Load Cell Pulley, and Top Guide Pulley. See Figure 6.32

NOTE:
The left side of the Chassis incorporates a Window to facilitate proper routing of the Traction Cord.

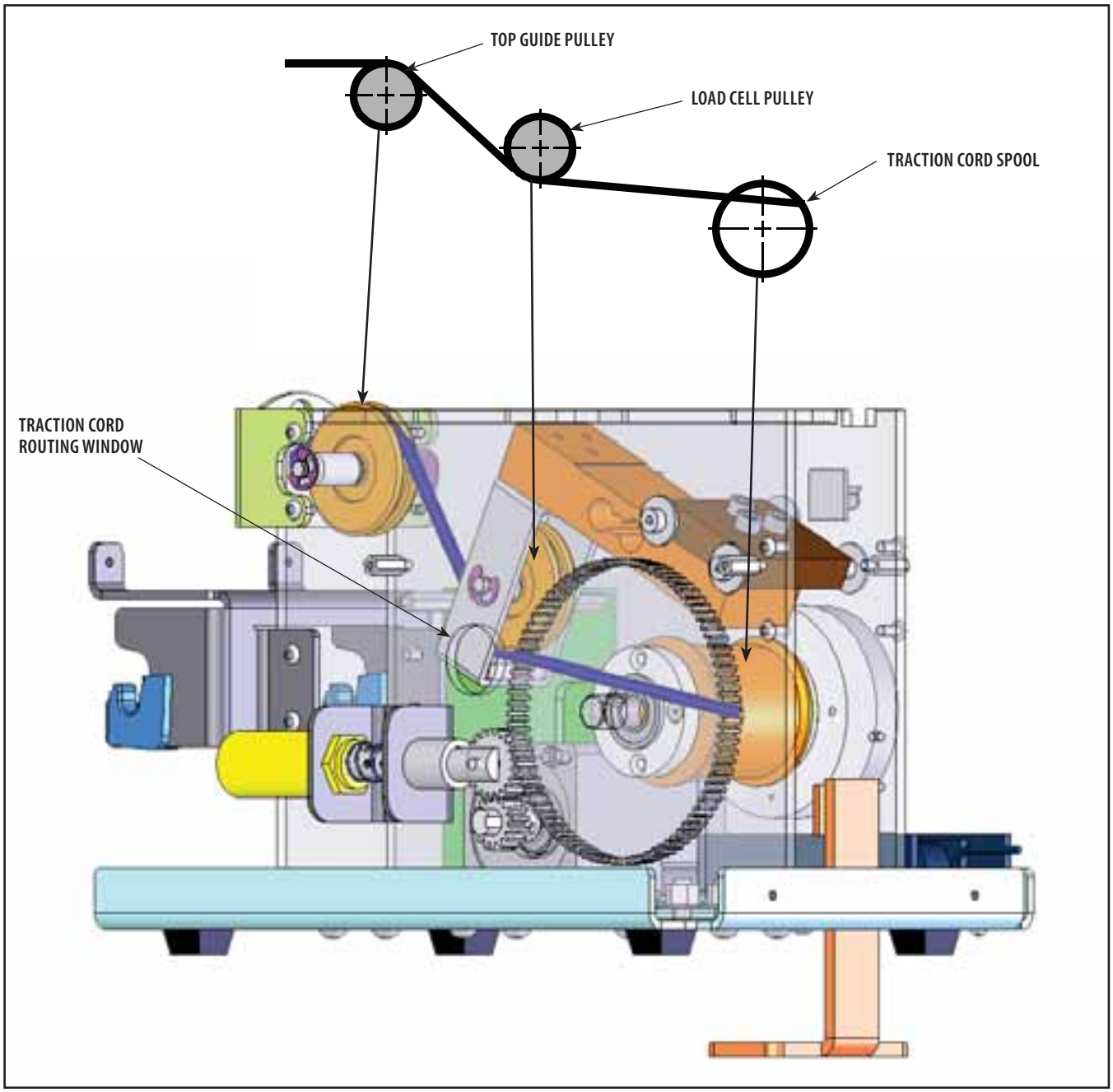


FIGURE 6.32

6.9 TRACTION CORD REMOVAL & REPLACEMENT (continued)

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

2. Pull enough of the Traction Cord through the Traction Cord Spool to allow the knot to be tied.
3. Tie a Figure Eight (Flemish, Savoy) Knot in the end of the Cord passing through the Traction Cord Spool. See Figure 6.33.

⚠ DANGER

Do not use any other knot styles in the Cord other than those specified in this manual. Use of other knot styles could cause Cord to completely disengage from the system causing serious injury to patient and personnel.

4. Trim any fraying from the Traction Cord leaving 19 mm (0.75 in) of Cord outside the Figure Eight (Flemish, Savoy) Knot.
5. Singe the Cord end until the outer jacket and inner core of the Traction Cord melt together. See Figure 6.34A.
6. Pull other end of Traction Cord until the Figure Eight (Flemish, Savoy) Knot is completely seated within the Traction Cord Spool. See Figure 6.34B.

NOTE:
It may be necessary to use a long, thin tool such as a Flat Blade Screwdriver to properly tuck the Figure Eight (Flemish, Savoy) Knot into the Traction Cord Spool.

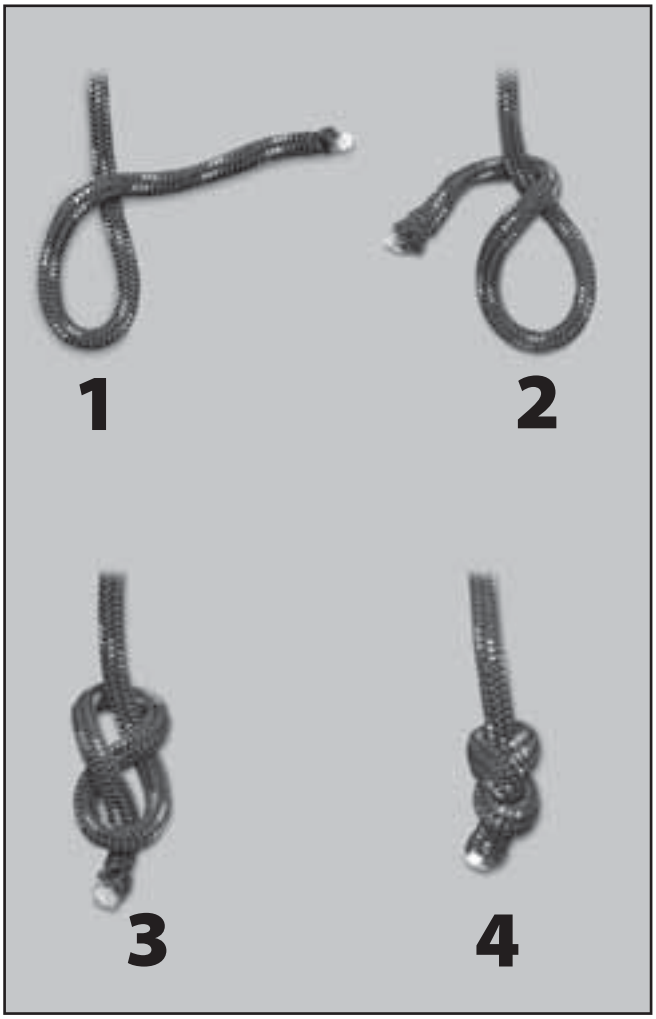


FIGURE 6.33

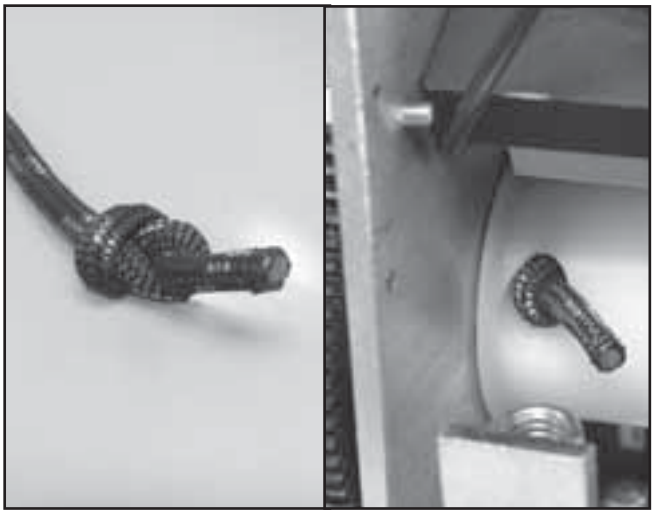


FIGURE 6.34A **FIGURE 6.34B**

6.9 TRACTION CORD REMOVAL & REPLACEMENT (continued)

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

7. Route Traction Cord through the Front Cord Guide Support.
8. Route Traction Cord through the Top Cover and place the Top Cover in Position on the Chassis. See Figure 6.35. Do not secure Top Cover at this time.
9. Inspect Traction Cord Knuckle for damage and wear. Replace if damaged or worn.
10. Route Traction Cord through Traction Cord Knuckle Cover and Cord Knuckle. Tie an Overhand or Half Knot in the end of the Traction Cord leaving 25.5 mm (1.00 in) of Traction Cord outside the knot. See Figure 6.36.
11. Trim any fraying from the end of the Traction Cord and singe the Cord end until the outer jacket and inner core of the Traction Cord melt together. Make certain at least 19 mm (0.750 in) of Traction Cord still remains outside the knot. See Figure 6.36 inset.

⚠ DANGER

Do not use any other knot styles in the Cord other than those specified in this manual. Use of other knot styles could cause Cord to completely disengage from the system and may cause serious injury to patient and personnel.

12. Secure the knot inside the Traction Cord Knuckle ensuring the loose end enters the Bore inside the Traction Cord Knuckle. See Figure 6.37. Slide Traction Cord Knuckle Cover into position over the knot. See Figure 6.37 inset.

NOTE:
It may be necessary to use a long, thin tool such as a Flat Blade Screwdriver to properly tuck the loose end of the Traction Cord into the Bore of the Traction Cord Knuckle.

FIGURE 6.35

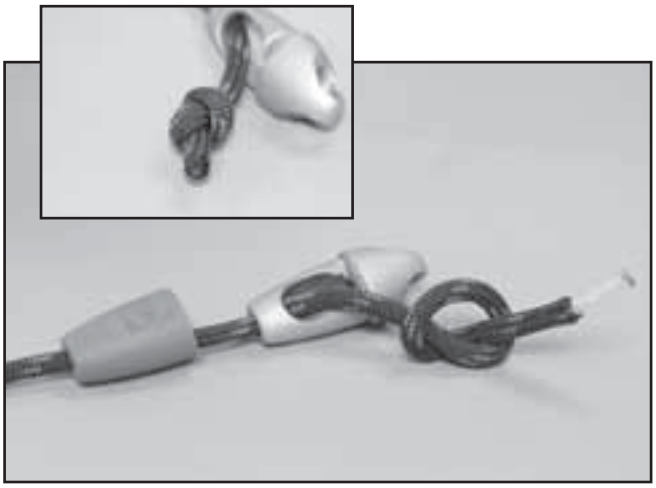


FIGURE 6.36

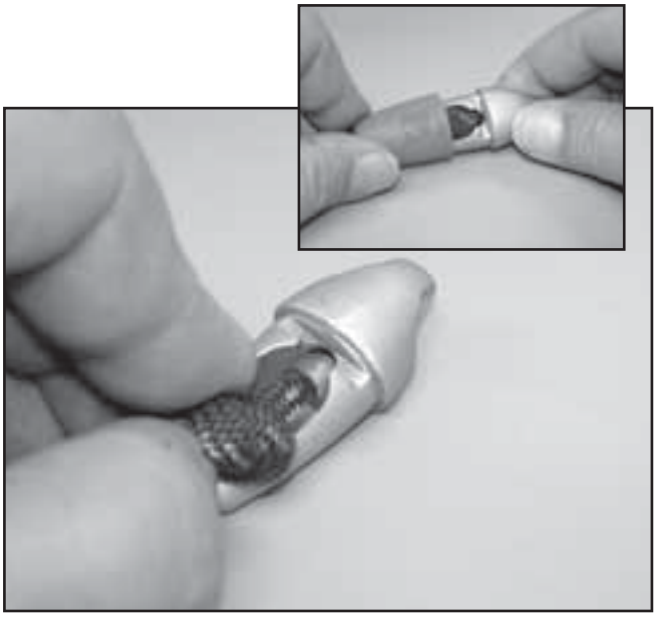


FIGURE 6.37

6.9 TRACTION CORD REMOVAL & REPLACEMENT (continued)

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

NOTE:
If adjusting Spring Tension only and not replacing the Traction Cord, it will be necessary to remove the Side Covers and have available the Tools required in 6.9, B.

13. Manually release the Solenoid and simultaneously fully extend the Traction Cord. Release Solenoid and make certain the Solenoid Gear fully engages the Large Driven Gear. See Figure 6.38.

14. With the Cord fully extended, rotate the Cord Spring Housing clockwise until the Cord Spring is completely wound, then rotate counterclockwise 1/4 to 1/2 turn. Hold the Cord Spring Housing in position and tighten the Retaining Screw using the 5/32 in Allen Wrench. See Figure 6.39.

NOTE:
Overtightening of the Cord Spring Housing Retaining Screw will break the housing and cause the spring to lose tension.

15. While holding on to the Traction Cord, manually release the Solenoid and allow the Traction Cord to retract.

16. Manually release the Solenoid and simultaneously fully extend the Traction Cord. Release Solenoid and make certain it fully engages the Large Driven Gear.

17. Using Tape Measure, measure the length of the Cord from the Cord Guide Cover to the end of the Harness Clip. See Figure 6.40. Measurement should be 96.5 cm to 106.5 cm (38 in to 42 in).

a) If measurement is less than 96.5 cm (38 in), Spring Tension is too tight. Loosen the Spring Housing Retaining Screw and allow the housing to release no more than 1/2 revolution of tension. Tighten Spring Housing Retaining Screw and repeat steps 15 and 16.

b) If measurement is more than 106.5 cm (42 in), increase Traction Cord Spring Tension by no more than 1/2 revolution.

18. Repeat step 17 a or b until Cord dimension is correct.

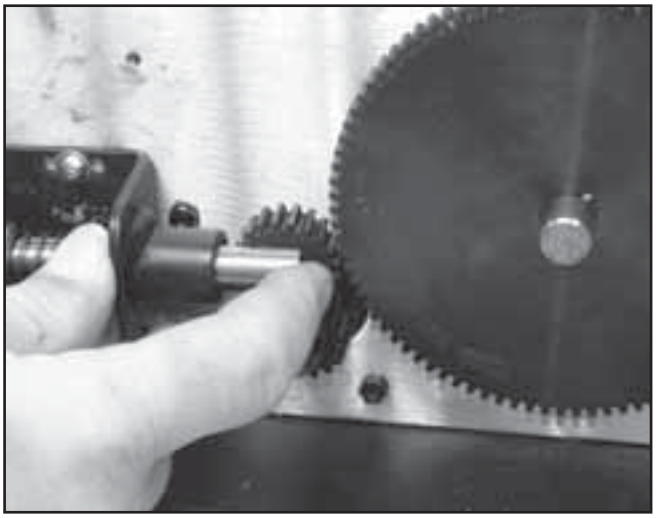


FIGURE 6.38

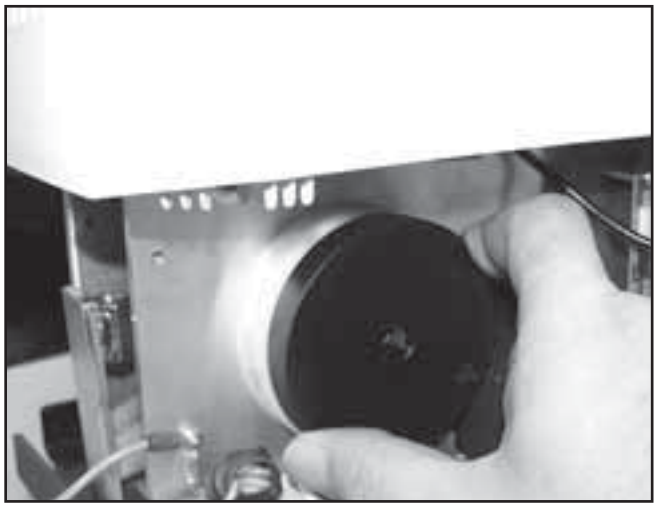


FIGURE 6.39

FIGURE 6.40

6.9 TRACTION CORD REMOVAL & REPLACEMENT (continued)

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

19. Install Clamp Spring Assembly. Refer to 6.8 Clamp Spring Assembly Removal & Replacement.
20. Install Rear Cover. Refer to 6.3 Rear Cover Removal & Replacement.
21. Install Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement.
22. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
23. Perform complete Calibration and Burn In of unit.

⚠ WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

6.10 CORD TENSION SPRING REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Cord Tension Spring 80653

B. Equipment Required

- 3/32 in Allen Wrench
- 5/32 in Allen Wrench

C. Cord Tension Spring Removal

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Remove the Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement, part C, steps 2-5.
3. While holding the Cord Tension Spring Housing with one hand. Loosen the retaining screw with the other hand using the 5/32 in Allen Wrench. See Figure 6.41.
4. Gradually allow the Spring Housing to rotate in the hand releasing spring tension.
5. Rotate the Cord Tension Spring Housing until the hole in the face aligns with the Spring Mounting Screw. Remove screw with the 3/32 in Allen Wrench. See Figure 6.42.
6. Remove the Cord Tension Spring Housing Mounting Screw. See Figure 6.43.
7. Remove Cord Tension Spring and Housing from unit.

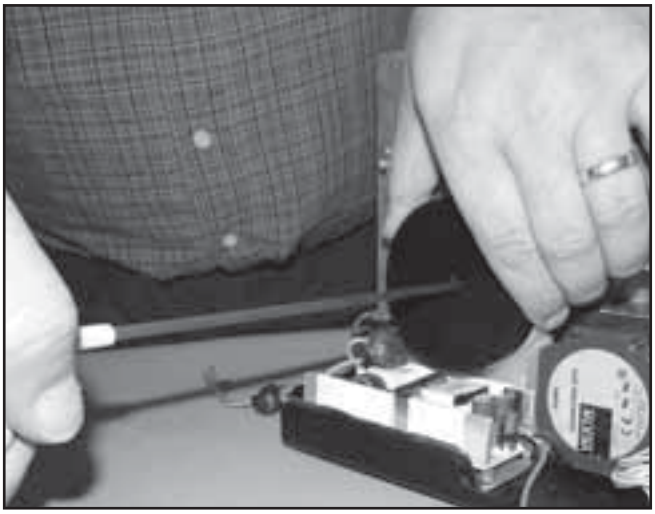


FIGURE 6.41

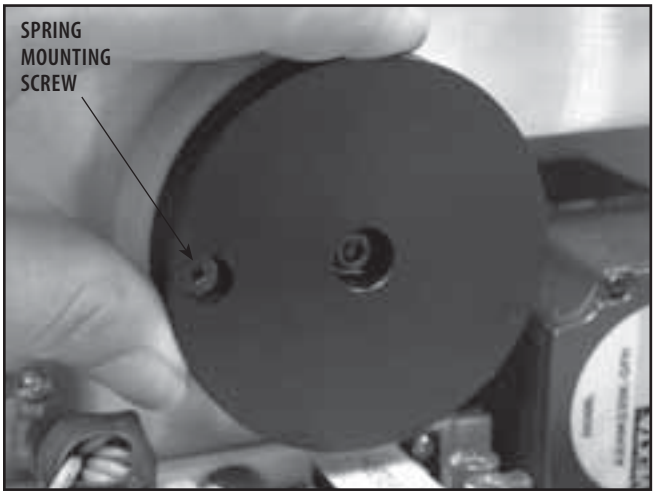


FIGURE 6.42

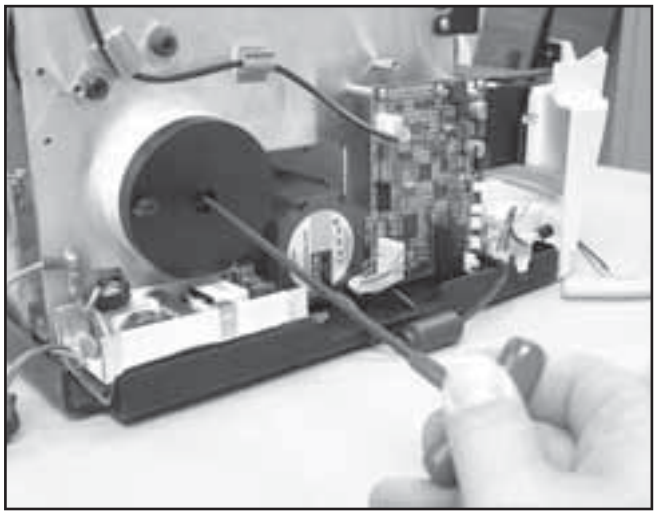


FIGURE 6.43

6.10 CORD TENSION SPRING REMOVAL & REPLACEMENT (continued)

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

D. Cord Tension Spring Replacement

1. Position new Cord Tension Spring in Housing as shown in Figure 6.44.
2. Place Spring Mounting Screw through hole in face of the Housing and through the Cord Tension Spring Mounting Loop. Leave the head of the Spring Mounting Screw protruding through the Housing. See Figure 6.45
3. Position the Spring and Housing assembly in the mounting position on the Chassis. Start the Spring Mounting Screw using the 3/32 in Allen Wrench. Tighten Mounting Screw until Cord Tension Spring Mounting Loop is secure then, back the screw out one complete revolution. See Figure 6.46.
4. Position the Spring and Housing so that the Housing Mounting Screw can be started. Start screw with the 5/32 in Allen Wrench.
5. Adjust Spring Tension. Refer to page 42.
6. Install Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement.
7. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
8. Perform complete Calibration and Burn In of unit.

⚠ WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT
AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

FIGURE 6.44

FIGURE 6.45

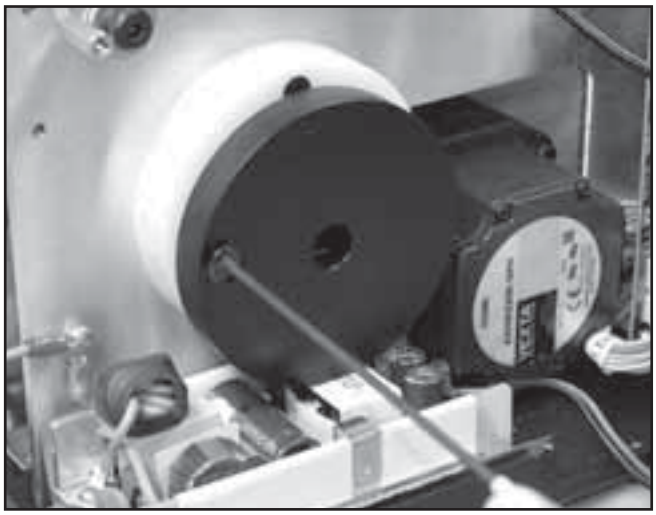


FIGURE 6.46

6.11 SOLENOID ASSEMBLY REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Solenoid Assembly 48014

B. Equipment Required

- 9/64 in Allen Wrench
- Solenoid Assembly Mounting Jig(P/N 48139)

C. Solenoid Assembly Removal

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Make certain the Cord is fully retracted. If necessary, manually retract. Refer to Figure 5.12.
3. Disconnect the Solenoid Assembly Harness from Motor Control Board. See Figure 6.47.
4. Using the 9/64 in Allen Wrench, remove the two Solenoid Assembly Mounting Screws. See Figure 6.48.

D. Solenoid Assembly Replacement

1. Position the Solenoid Assembly Mounting Jig onto the Shafts of the Large Driven Gear and the Motor Gear. See Figure 6.49.
2. Position the Solenoid Assembly so gears are fully seated and the front and bottom of the Bracket are against the Solenoid Assembly Mounting Jig. Secure with screws. See Figure 6.49.
3. Connect Solenoid Assembly Harness to Motor Control Board. See Figure 6.47.
4. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
5. Perform complete Calibration and Burn In of unit.

⚠ WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

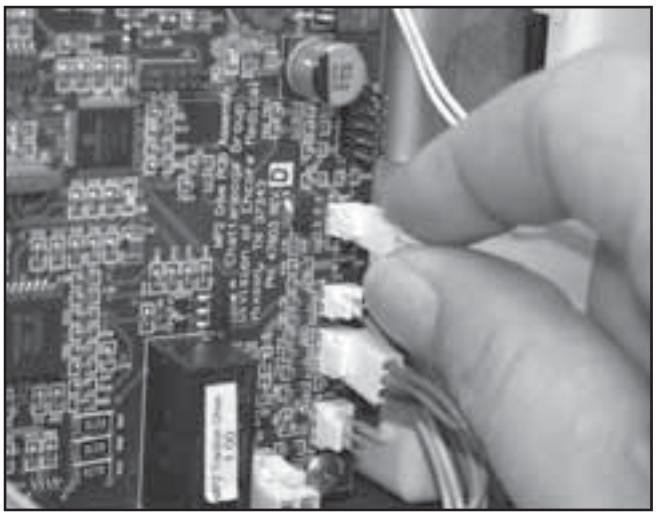


FIGURE 6.47

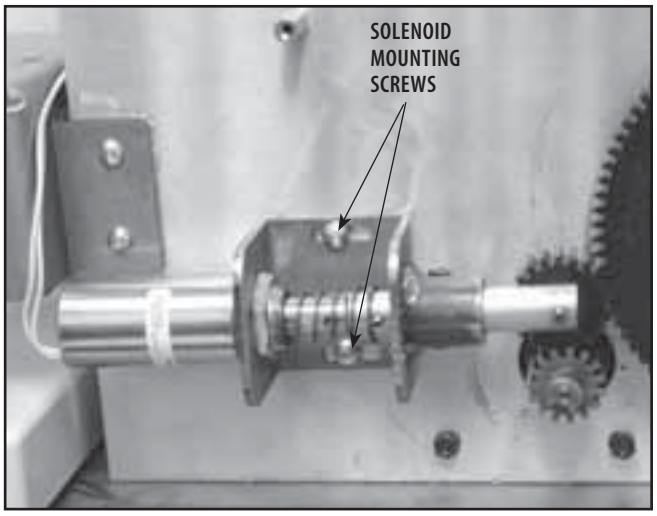


FIGURE 6.48

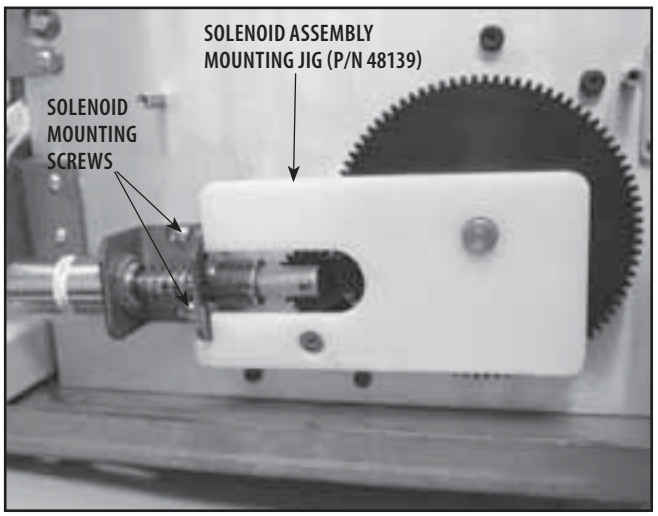


FIGURE 6.49

6.12 POWER SUPPLY REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Power Supply 27265

Power Supply Shield 27592

B. Equipment Required

- 3/32 in Allen Wrench
- #2 Phillips Screwdriver
- Digital Multimeter (Set to VDC)

C. Power Supply Removal

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Remove the Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement.
3. Remove Rear Cover. Refer to 6.3 Rear Cover Removal & Replacement.
4. Disconnect the Power Supply Input Harnesses from the Mains Connector. See Figure 6.50A.
5. Disconnect Power Supply Output Harness from the Motor Control Board. See Figure 6.50B.
6. Using the 3/32 in Allen Wrench, remove the Ground Harnesses from the Chassis. See Figure 6.51.
7. Using the Multimeter set to VDC discharge the Power Supply Capacitor at C4. See Figure 6.52.

⚠ DANGER

- Power Supplies retain High Voltage!
- Discharge the C4 Capacitor prior to complete removal of the Power Supply.

8. Using the #2 Phillips Screwdriver, remove the four Power Supply Mounting Screws.
9. Grasp the sides of the Power Supply and carefully remove from the chassis.

FIGURE 6.50A

FIGURE 6.50B

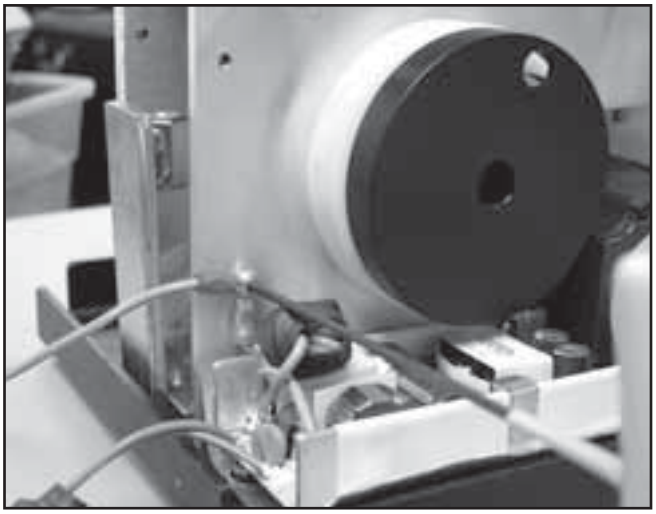


FIGURE 6.51

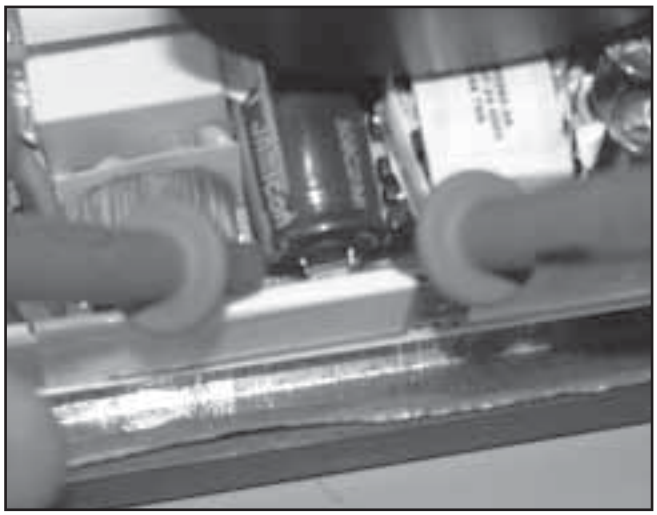


FIGURE 6.52

6.12 POWER SUPPLY REMOVAL & REPLACEMENT (continued)

WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

D. Power Supply Replacement

1. Prior to handling new Power Supply, discharge the Capacitor at C4. Refer to page 47.

DANGER

- Power Supplies retain High Voltage!
- Discharge the C4 Capacitor prior to handling of the new Power Supply.

2. Make certain the Shield is in place with the nonconductive (black) side toward the Power Supply. Position the Power Supply on the Chassis. Secure with the four Power Supply Mounting Screws. See Figure 6.53.
3. Using the 3/32 in Allen Wrench and Ground Harness Mounting Screw, secure the Ground Harnesses from the Power Supply and the Mains Connector to the Chassis. See Figure 6.53.
4. Connect the Power Supply Input Harnesses to the Mains Connector Harnesses. See Figure 6.54A.
5. Connect the Power Supply Output Harness to the Motor Control Board. See Figure 6.54B.
6. Install Rear Cover. Refer to 6.3 Rear Cover Removal & Replacement.
7. Install Top Cover. Refer to 6.2 Top and Cord Guide Cover Removal & Replacement.
8. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
9. Perform complete Calibration and Burn In of unit.

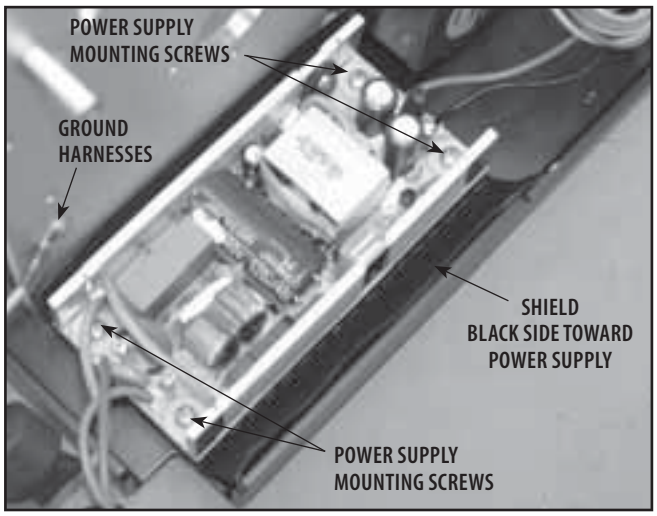


FIGURE 6.53

FIGURE 6.54A

FIGURE 6.54B

WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

6.13 MOTOR ASSEMBLY REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Motor Assembly 48019

B. Equipment Required

- 3/32 in Allen Wrench
- 3 mm Allen Wrench
- 7 mm Box End Wrench
- Solenoid Assembly Mounting Jig

C. Motor Assembly Removal

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Make certain Traction Cord is completely retracted. If necessary, manually release Solenoid to retract Cord.
3. Loosen the Solenoid Mounting Screws enough to rotate Solenoid Gear up and off of the Motor Gear. See Figure 6.55.
4. Disconnect the Motor Harness from the Motor Control Board. See Figure 6.56.
5. Using the 3 mm Allen Wrench and 7 mm Boxed End Wrench, remove the four Motor Assembly Mounting Screws. See Figure 6.57.
6. Remove Motor Assembly from Chassis.

NOTE:
It may be necessary to remove the Motor Control Board. Refer to 6.5 Motor Control Board Removal & Replacement.

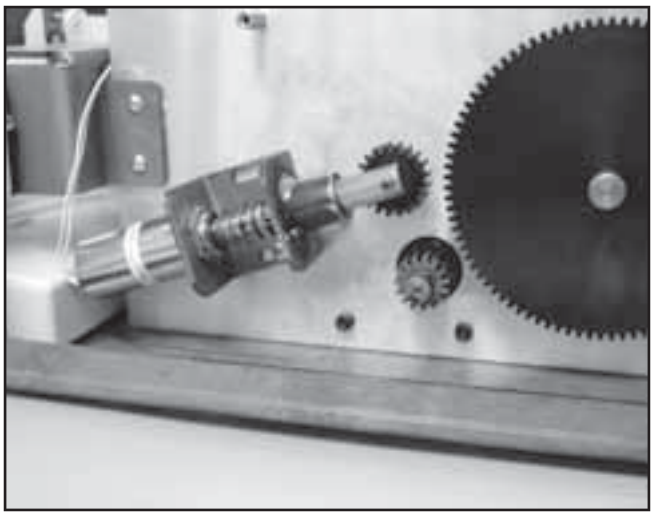


FIGURE 6.55

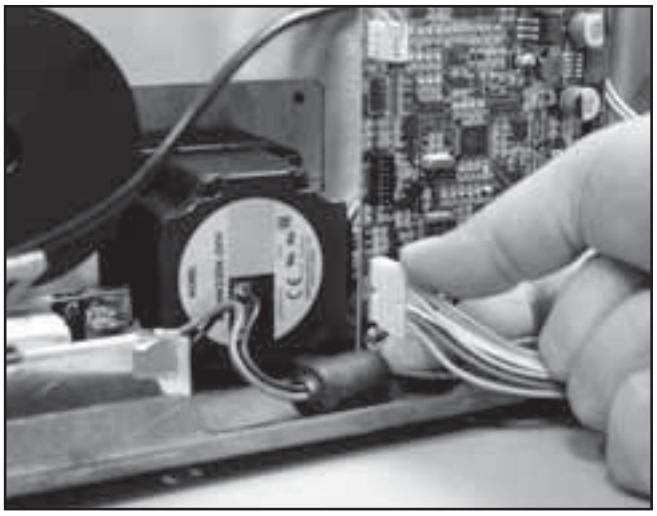


FIGURE 6.56

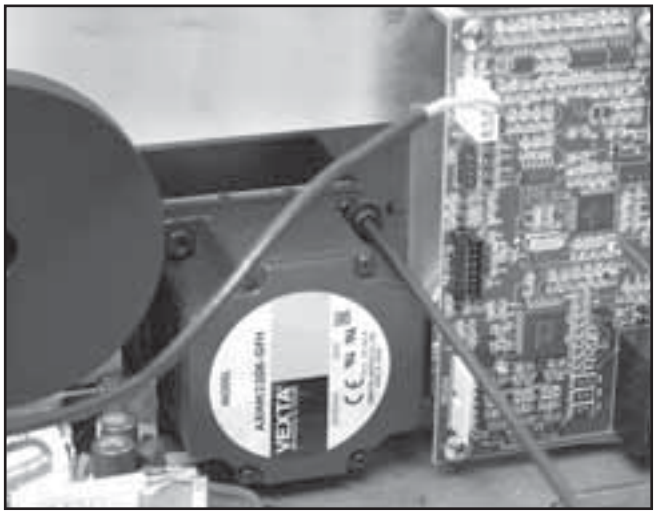


FIGURE 6.57

6.13 MOTOR ASSEMBLY REMOVAL & REPLACEMENT (continued)

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

D. Motor Assembly Replacement

1. Position new Motor Assembly into Chassis and secure with the four Motor Assembly Screws, Lock washers, and Nuts. See Figure 6.58.
2. Position and adjust the Solenoid. Refer to 6.11 Solenoid Assembly Removal & Replacement.

NOTE:
If Motor Control Board was removed, re-install before proceeding to step 3 below.

3. Connect the Motor Assembly Harness to the Motor Control Board. See Figure 6.59.
4. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
5. Perform complete Calibration and Burn In of unit.

⚠ WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT
AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

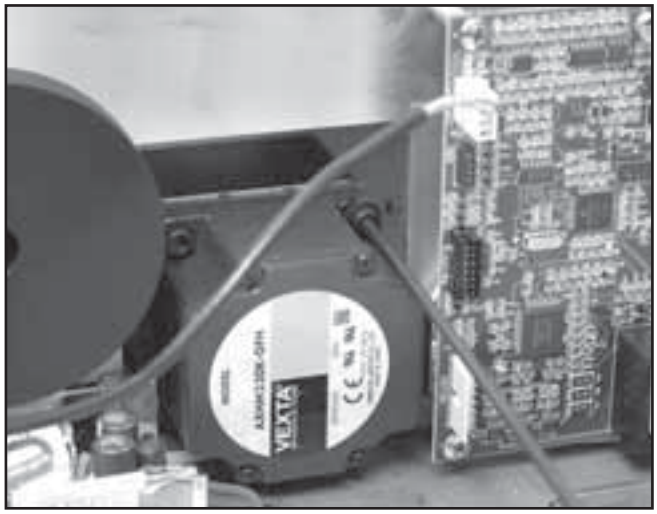


FIGURE 6.58

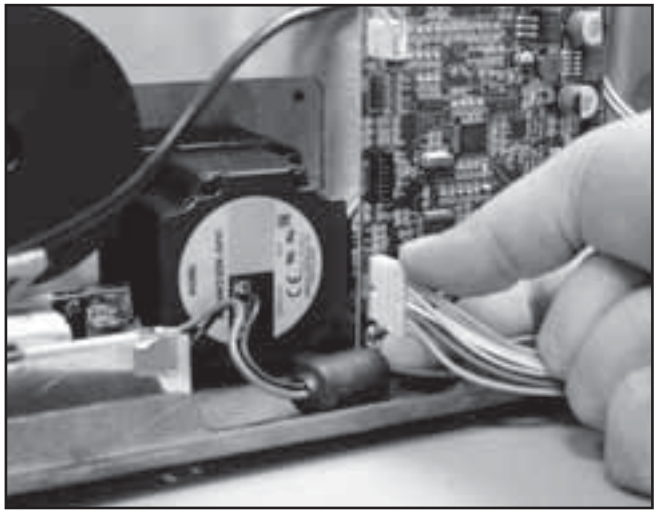


FIGURE 6.59

6.14 MOTOR DRIVE GEAR REMOVAL & REPLACEMENT

⚠ WARNING

Unplug the unit from the power source before attempting removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Motor Drive Gear 48024

B. Equipment Required

- 3/32 in Allen Wrench
- Solenoid Assembly Mounting Jig
- Tape Measure

C. Motor Drive Gear Removal

1. Remove Side Covers. Refer to 6.1 Side Cover Removal & Replacement.
2. Make certain Traction Cord is completely retracted. If necessary, manually release Solenoid to retract Cord.
3. Rotate Motor until Drive Gear Set Screw is accessible. See Figure 6.60.
4. Using the 3/32 in Allen Wrench, loosen the Drive Gear Set Screw and pull the Drive Gear from Motor Shaft.

D. Motor Drive Gear Replacement

1. Install new Motor Drive Gear onto Motor Shaft. Align Set Screw with the Key Slot in the Motor Shaft. See Figure 6.61.
2. Adjust the Gear position until the face of the gear is 9.5 mm (3/8 in) from the face of the shaft. See Figure 6.61.
3. Tighten the Set Screw with the 3/32 in Allen Wrench.
4. Install Side Covers. Refer to 6.1 Side Cover Removal & Replacement.

⚠ WARNING

This removal and replacement procedure requires that the following be performed after component or assembly replacement to ensure proper alignment and operation of the unit:

1. COMPLETE CALIBRATION OF UNIT-
Refer to Section 7
AND
2. MINIMUM OF 2 HOUR BURN IN OF UNIT AFTER SUCCESSFUL CALIBRATION-
Refer to Section 7

Failure to perform either of these procedures after a component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

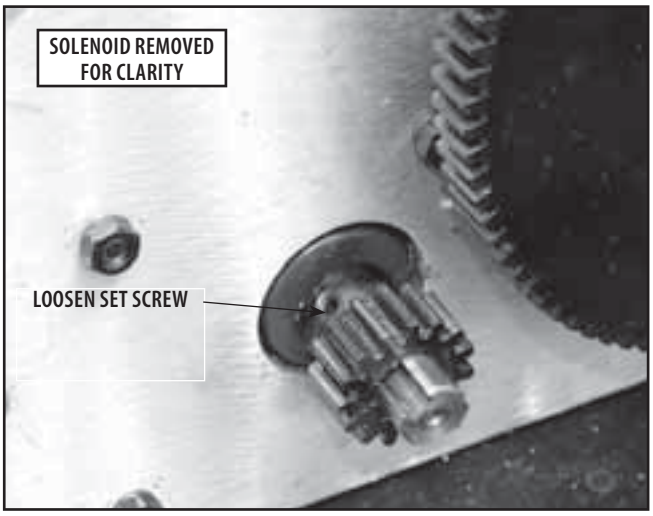


FIGURE 6.60

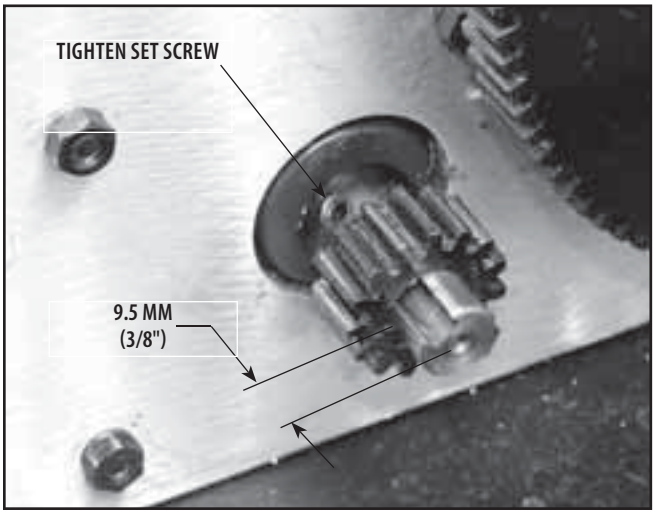


FIGURE 6.61

7.1 UNIT CALIBRATION

⚠ WARNING

Certain removal and replacement procedures require that complete Unit Calibration and Burn In be performed prior to placing the unit back into service.

Failure to perform either of these procedures after certain component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

A. General Information

1. The Calibration and Burn-In Procedures in this section must be performed annually and when field service requires removal and replacement of certain components.
2. The Calibration Procedure requires use of US lb Weight Measurements. The software is fixed and will not perform conversions of Metric Weight Measurements for this critical procedure. Therefore, when constructing and equipping the Calibration Fixture, it is required that the Electronic Load Cell Components be capable of expressing US lbs.
3. The fabrication of a Calibration Fixture is required for these units.

B. Equipment Required

Calibration Fixture with calibrated Strain Meter

C. Unit Calibration Procedure

1. Place unit on Calibration Fixture and secure in position by tightening the unit Lock Knob. See Figure 7.1.
2. Connect unit to an approved power source.
3. Turn unit On.
4. Release Traction Cord and connect Accessory Clip to the Strain Meter. Leave slack in Cord. See Figure 7.2.
5. Zero Strain Meter LCD.

⚠ WARNING

When performing Unit Calibration Procedure, the Calibration Fixture Load Cell must be set to US lbs.

FIGURE 7.1

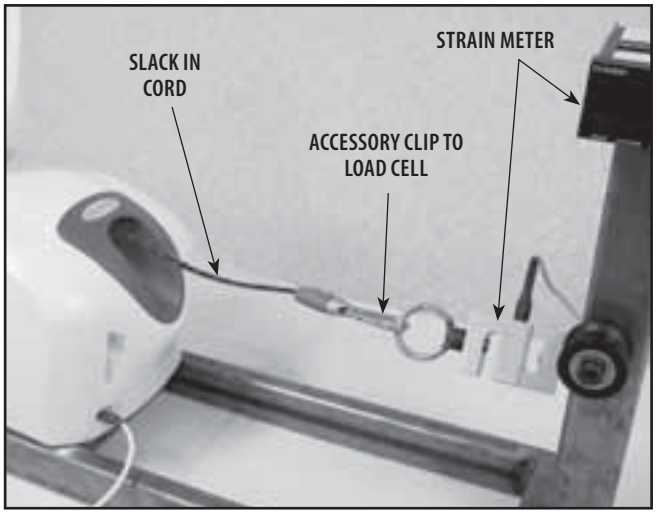


FIGURE 7.2

7.1 UNIT CALIBRATION (continued)

6. Press the Clinical Resources button. See Figure 7.3.

FIGURE 7.3

7. Simultaneously press the START, STOP, and Clinical Resources buttons. See Figure 7.4.

FIGURE 7.4

8. Press "Zero the Load Cell" on Touch Screen. See Figure 7.5.

9. When the screen message appears, "Load Cell has been zero calibrated!", touch the Touch Screen anywhere to continue.

FIGURE 7.5

7.1 UNIT CALIBRATION (continued)

10. Hold onto Traction Cord and press Rope Release to remove all slack from Traction Cord.

11. Press Calibrate Load Cell Bias on the Touch Screen. See Figure 7.6.

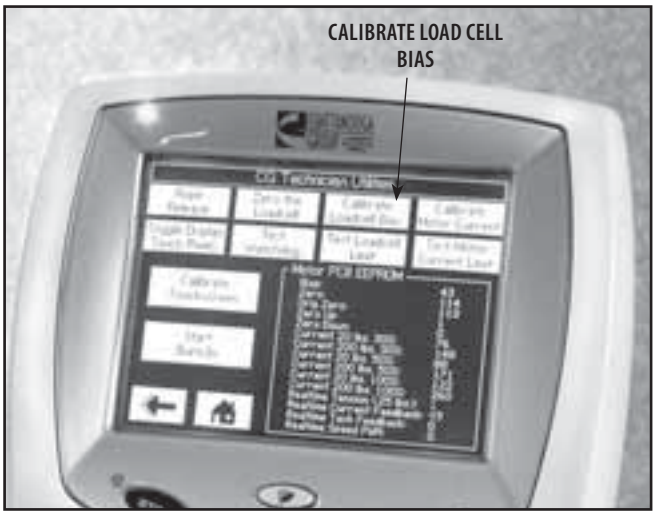


FIGURE 7.6

12. While watching the Strain Meter LCD, Figure 7.7A, press the Up and Down Arrow buttons, Figure 7.7B until 100 lbs is displayed on LCD.

13. Press Back icon on Touch Screen to set and accept calibration measurement.

NOTE:
Unit will display a validation message reading "Returning to zero" while releasing tension on the Traction Cord.

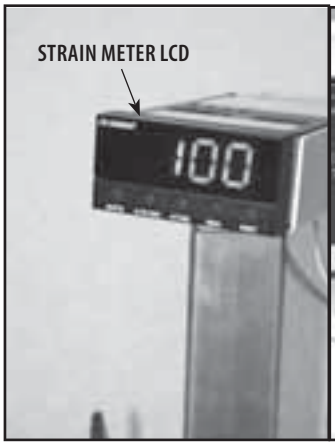


FIGURE 7.7A

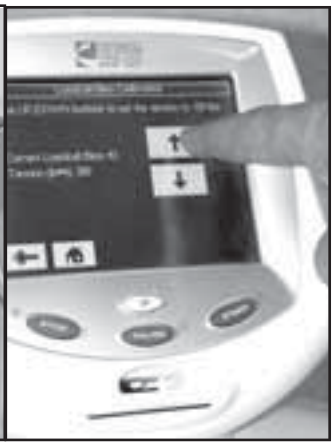


FIGURE 7.7B

14. Press Rope Release and pull enough Cord out to connect the Accessory Hook to the Lower Ring on the Calibration Fixture. See Figure 7.8.

15. Allow excess Traction Cord to feed back into unit and release Rope Release.

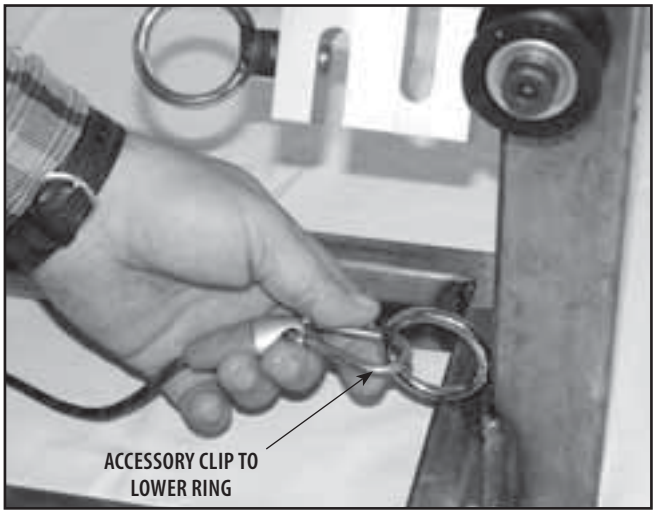


FIGURE 7.8

7.1 UNIT CALIBRATION (continued)

16. Press Calibrate Motor Current on the Touch Screen. See Figure 7.9.

17. Unit will display "Motor Current Calibration completed OK." When Motor Current Calibration is complete. Touch anywhere to continue.

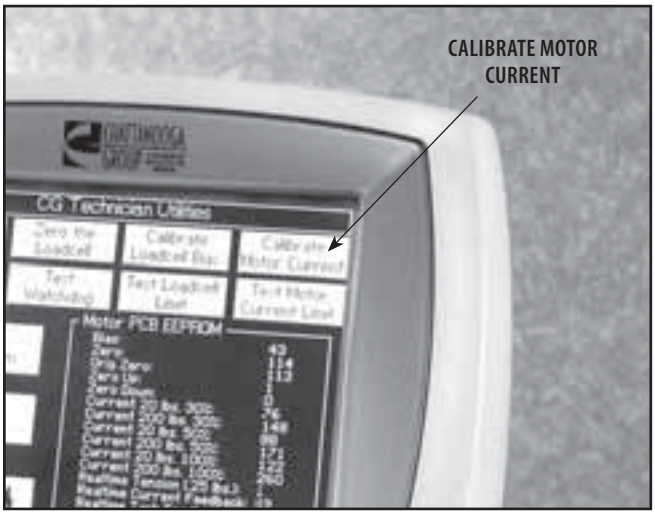


FIGURE 7.9

7.2 TOUCH SCREEN CALIBRATION

NOTE:
If the unit is not in the Calibration Mode, refer to 7.1, C, steps 6-7 to place unit in Calibration Mode.

A. Equipment Required

None

B. Touch Screen Calibration Procedure

1. Press Touch Screen Calibration on Touch Screen. See Figure 7.10.

2. Follow instructions on Touch Screen.

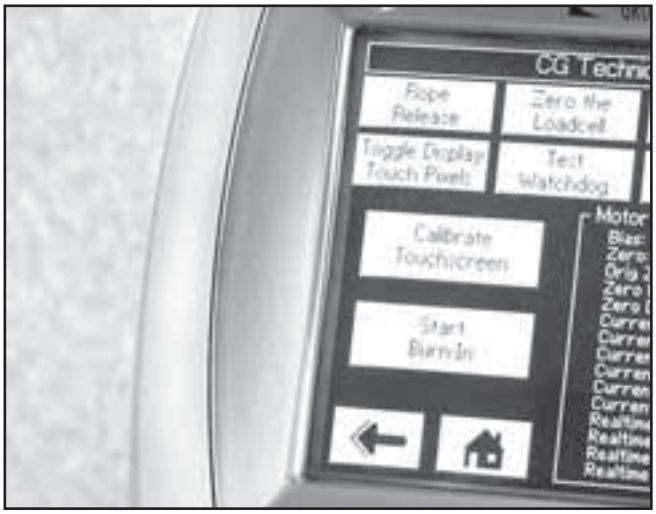


FIGURE 7.10

7.3 UNIT BURN IN

⚠ WARNING

Certain removal and replacement procedures require that complete Unit Calibration and Burn In be performed prior to placing the unit back into service.

Failure to perform either of these procedures after certain component or assembly replacement will void warranty and may result in injury to patients and severe equipment damage.

The following Burn In procedure must be allowed to cycle for a minimum of two hours after Calibration Procedures have been performed, but prior to placing the unit back into service.

A. Specifications

Burn In Intermittent Pull . . .0-200 US lbs ±10%

Burn In Time Period . . . . . .2 hours minimum

B. Equipment Required

Calibration Fixture with calibrated Strain Meter.

C. Burn In Set Up

1. Place unit on Calibration Fixture and secure in position by tightening the unit Lock Knob. See Figure 7.11.
2. Connect unit to an approved power source.
3. Turn unit On.
4. Release Traction Cord and connect Accessory Clip to the Load Cell. See Figure 7.2.
5. Zero Load Cell.

D. Burn In Procedure

1. Perform Burn In Set Up.
2. Press the Clinical Resources button.
3. Simultaneously press the STOP, Clinical Resources, and PAUSE buttons to access the Technical Screen.
4. Press Start Burn-In on the Touch Screen. See Figure 7.12.
5. After unit has cycled for a minimum of two hours, press the STOP button. Unit will return to the Home Screen.
6. Set up unit for a 100 lb Static pull. Start the pull and verify the readout for the Load Cell is 100 lbs ±10%.

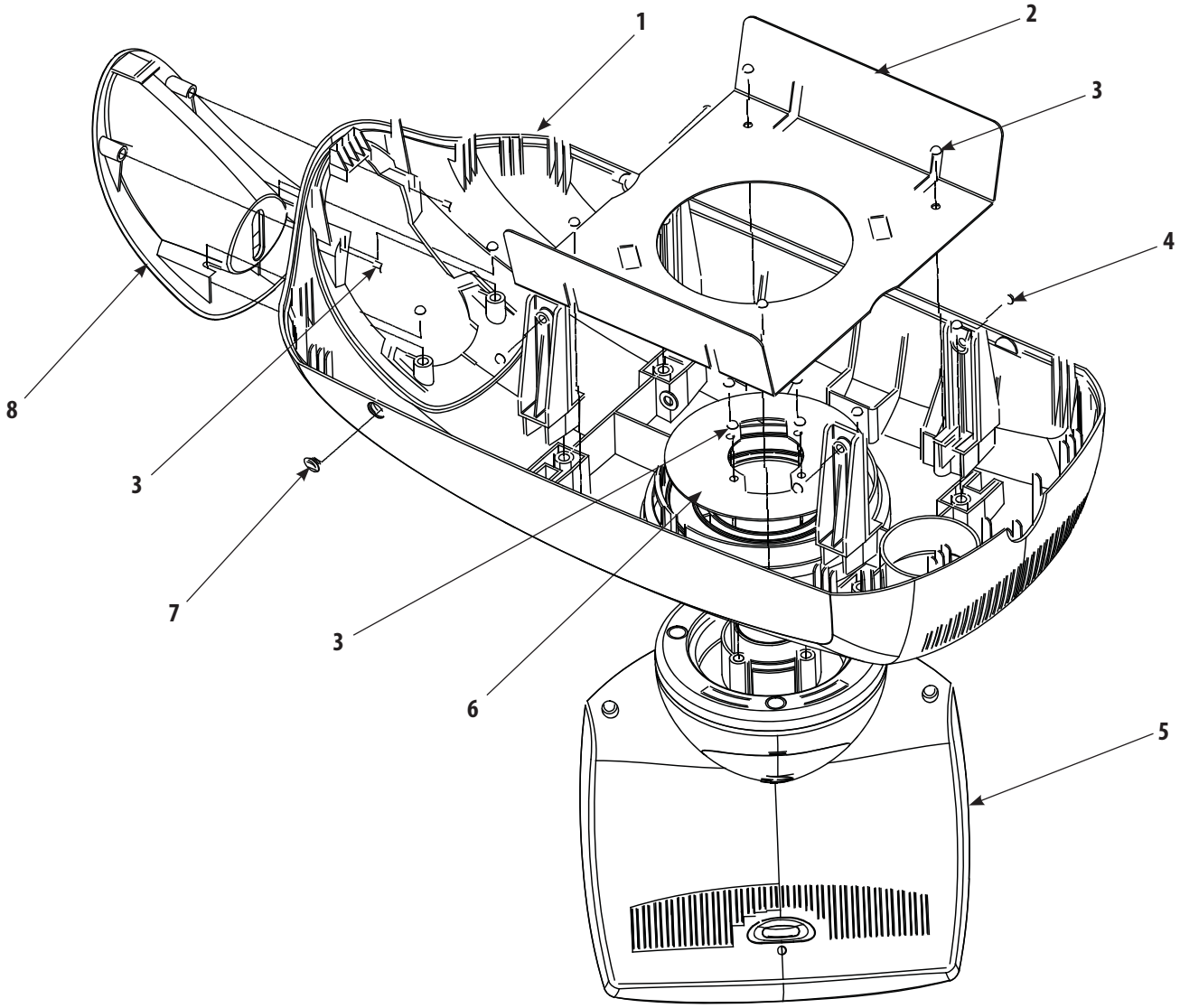
E. Burn-In Result

1. If Load Cell Readout is outside the specified range during the Static pull, perform Unit Calibration Procedure and Burn In procedure. Refer to pages 51-55.
2. If Load Cell Readout is within Specified Range during Static pull, unit is ready to be placed into service.

FIGURE 7.11

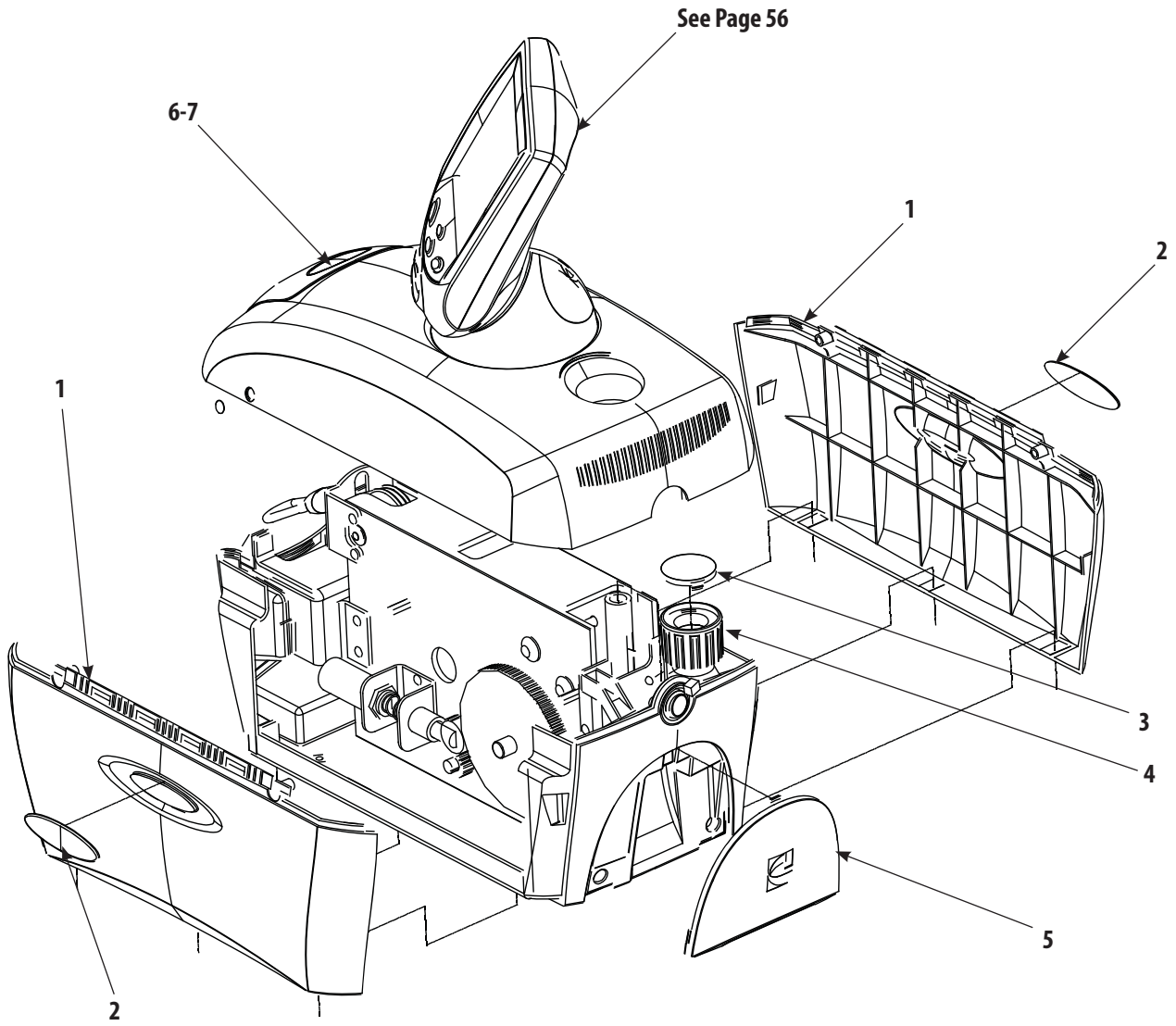
FIGURE 7.12

8.1 TOP COVER ASSEMBLY



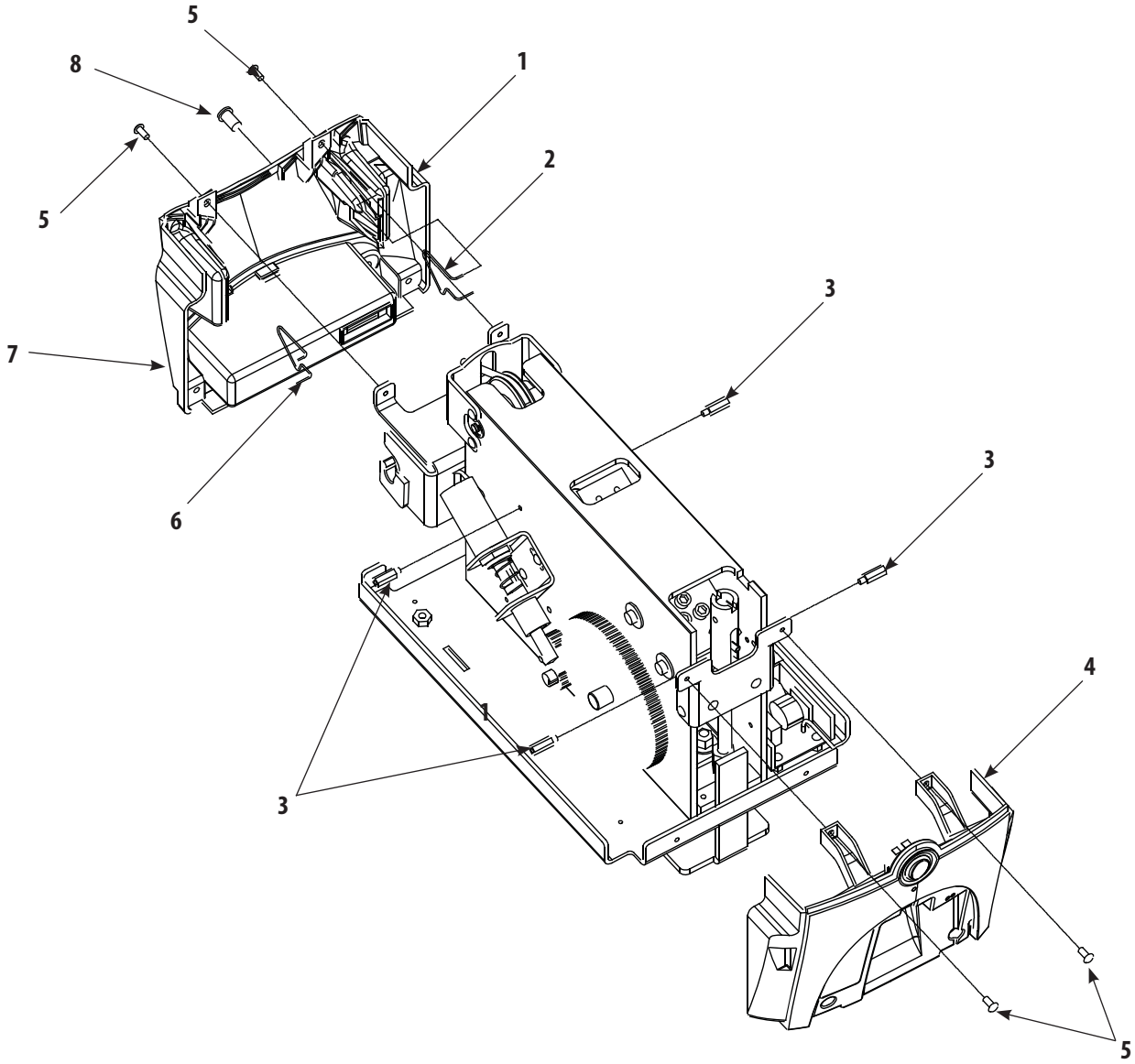
ITEM	PART NO.	DESCRIPTION	QTY
1	47856	Top Cover	1
2	48007	Top Moulding Plate	1
3	27137	Screw	10
4	60803	Screw	4
5	48063	Touch Screen Assembly	1
6	48062	Turn Table Plate	1
7	47896	Hook Cover	2
8	47872	Cord Guide Cover	1

8.2 SIDE COVERS



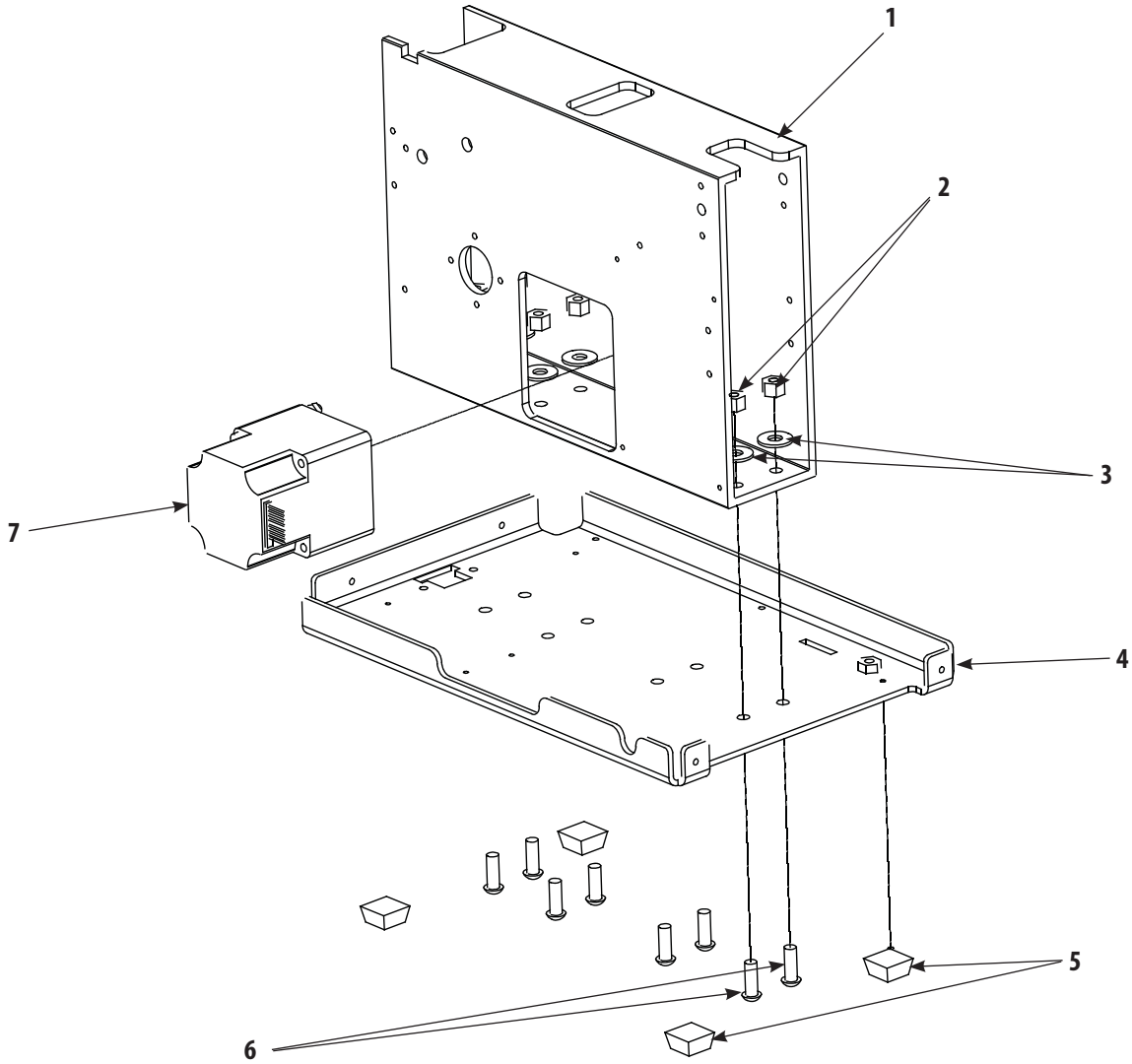
ITEM	PART NO.	DESCRIPTION	QTY
1	47857	Side Cover	2
2	47884	Side Badge	2
3	47871	Knob Cap	1
4	47869	Lock Knob	1
5	27008	IEC Connector Cover	1
6	48113	Tru-Trac Badge (Model 4779)	1
7	48114	TX Badge (Model 4759)	1

8.3 FRONT AND REAR COVERS



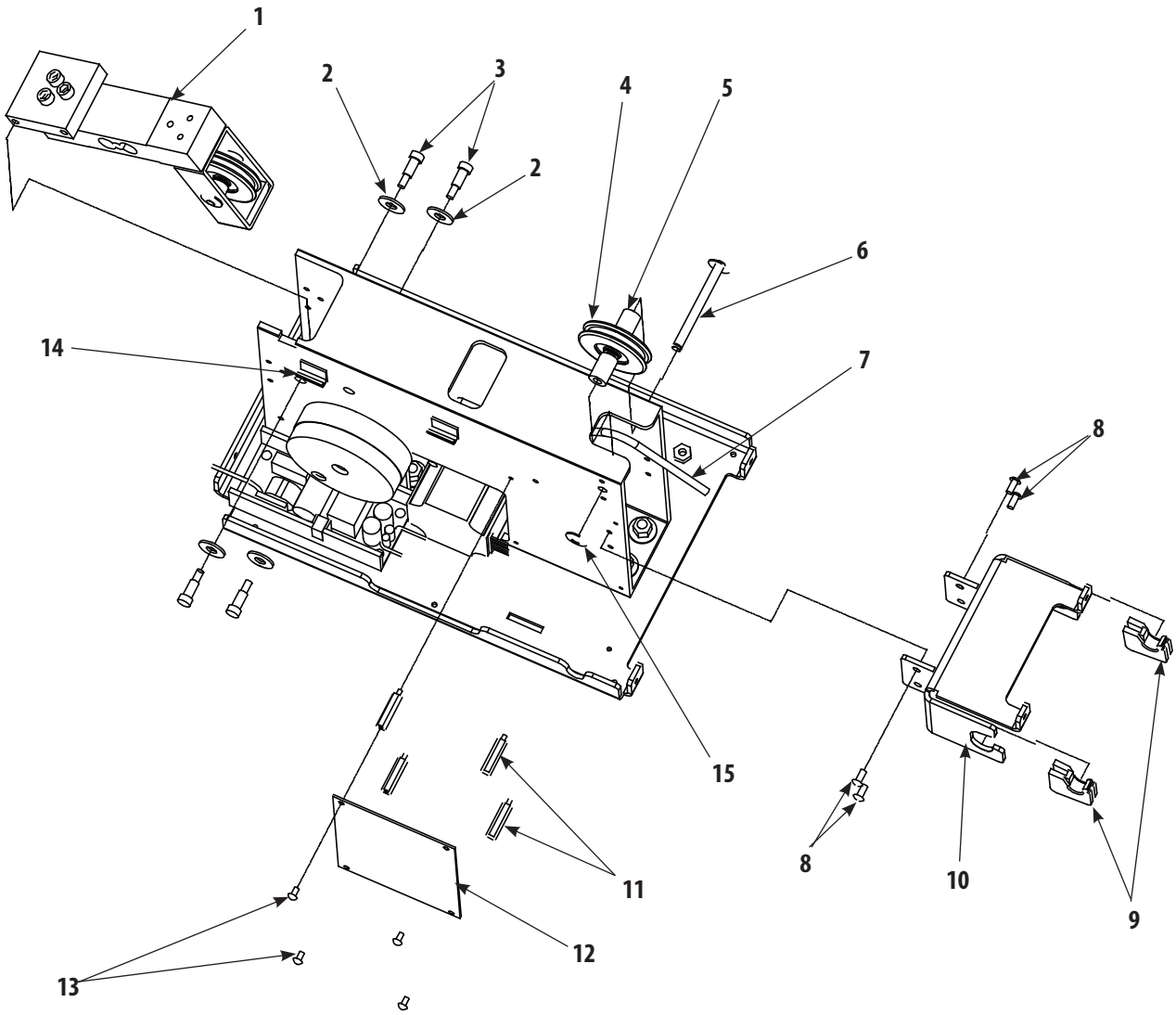
ITEM	PART NO.	DESCRIPTION	QTY
1	47858	Front Cover	1
2	48038	Left Spring	1
3	48070	Stand Off	4
4	48110	Rear Cover Assembly (includes wiring and hardware)	1
5	47851	Screw	8
6	48054	Right Spring	1
7	47878	Front Infill (Not Illustrated)	1
8	48040	Patient Switch Receptacle	1

8.4 BASE AND EXTRUSION ASSEMBLY



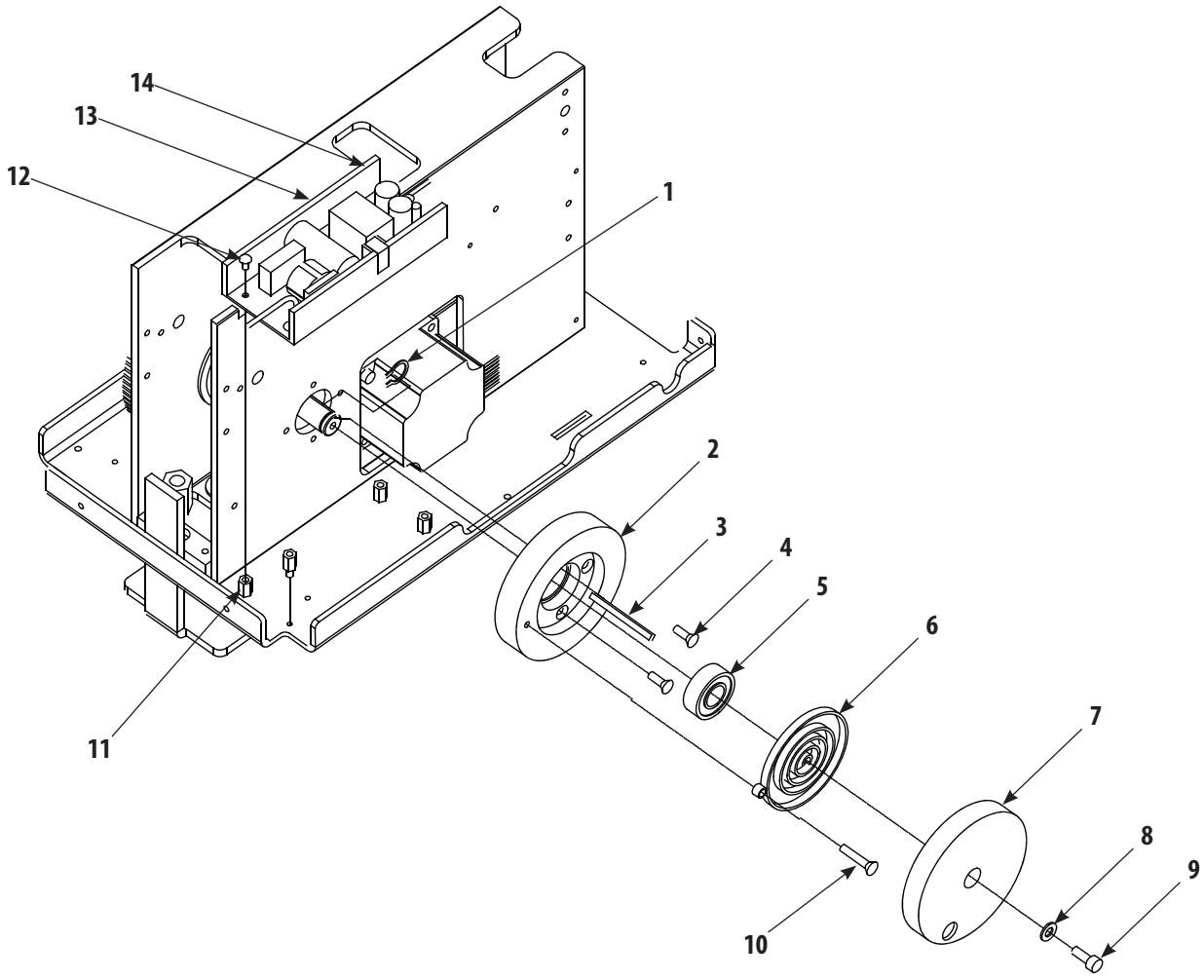
ITEM	PART NO.	DESCRIPTION	QTY
1	47833	Extrusion	1
2	70208	Hex Nut	8
3	21387	Flat Washer	8
4	47832	Base Plate	1
5	60014	Anti Skid Feet	4
6	62951	Screw	8
7	48019	Motor Assembly	1

8.5 CHASSIS ASSEMBLY



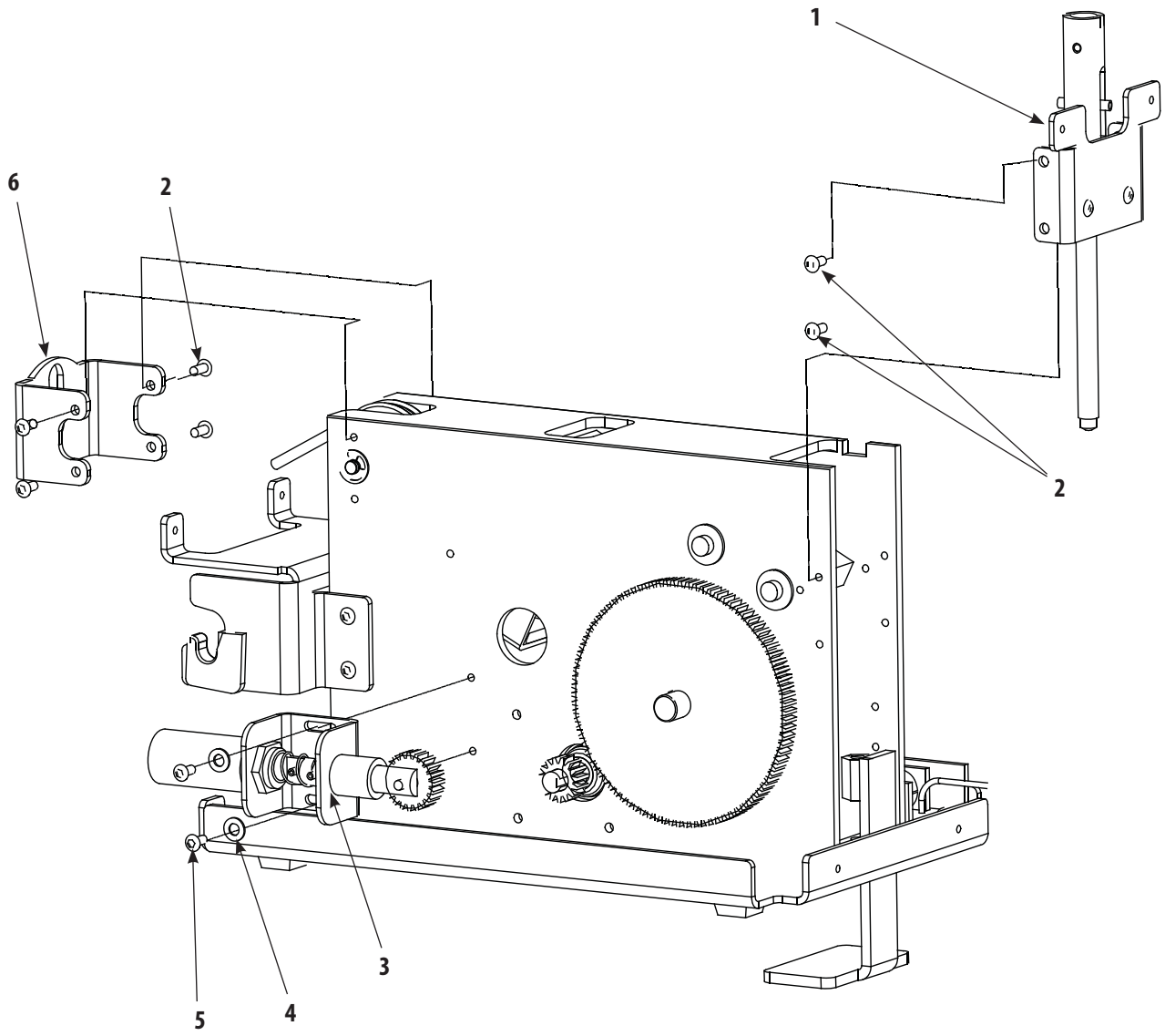
ITEM	PART NO.	DESCRIPTION	QTY
1	48009	Load Cell Assembly	1
2	21387	Flat Washer	4
3	48102	Shoulder Bolt	4
4	70369	Top Guide Pulley	1
5	48078	Top Guide Mounting Spacer	2
6	47998	Top Guide Pulley Axle	1
7	48031	Traction Cord	1
8	47851	Screw	4
9	47889	Spring Housing	2
10	48097	Front Cover Mounting Bracket	1
11	47850	Stand Off	4
12	47803	Motor Control Board	1
13	70777	Screw	4
14	78155	Cable Guide	2
15	48008	E-Clip	2

8.6 TRACTION CORD SPRING ASSEMBLY AND POWER SUPPLY



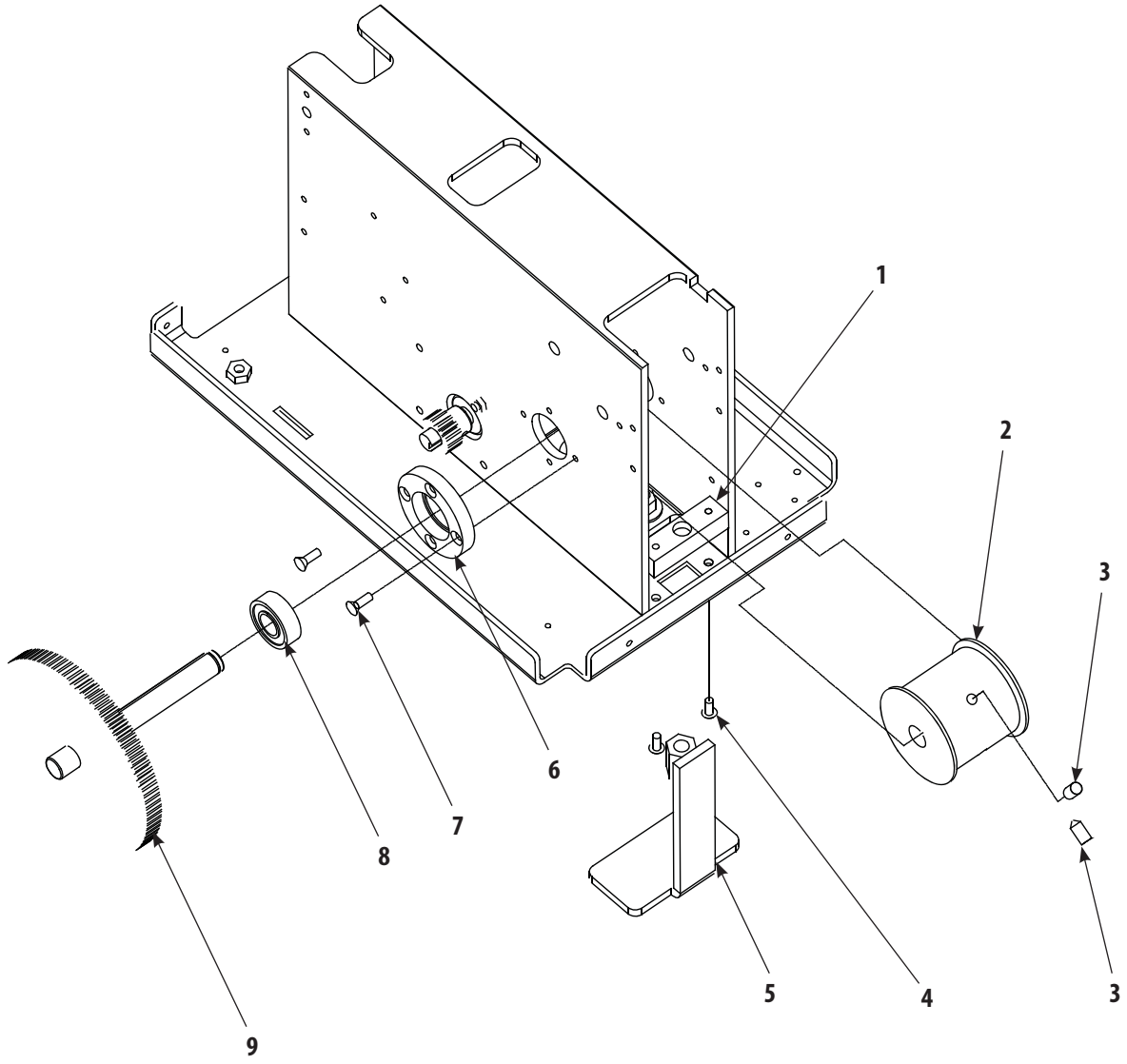
ITEM	PART NO.	DESCRIPTION	QTY
1	54758	Snap Ring	1
2	48106	Mounting Hub	1
3	73146	Square Key	1
4	48104	Screw	4
5	71934	Bearing	1
6	80653	Traction Cord Spring	1
7	80634	Spring Cover	1
8	21384	Flat Washer	1
9	47846	Screw	1
10	47823	Spring Mounting Screw	1
11	72559	Stand Off	4
12	31768	Screw	4
13	27592	Power Supply Shield	1
14	27265	Power Supply	1

8.7 SOLENOID AND CLAMP ASSEMBLIES



ITEM	PART NO.	DESCRIPTION	QTY
1	48023	Clamp Assembly	1
2	47851	Screw	8
3	48014	Solenoid Assembly	1
4	21384	Flat Washer	2
5	47851	Screw	2
6	48097	Front Traction Cord Guide	1

8.8 LARGE DRIVEN GEAR AND SPOOL ASSEMBLY



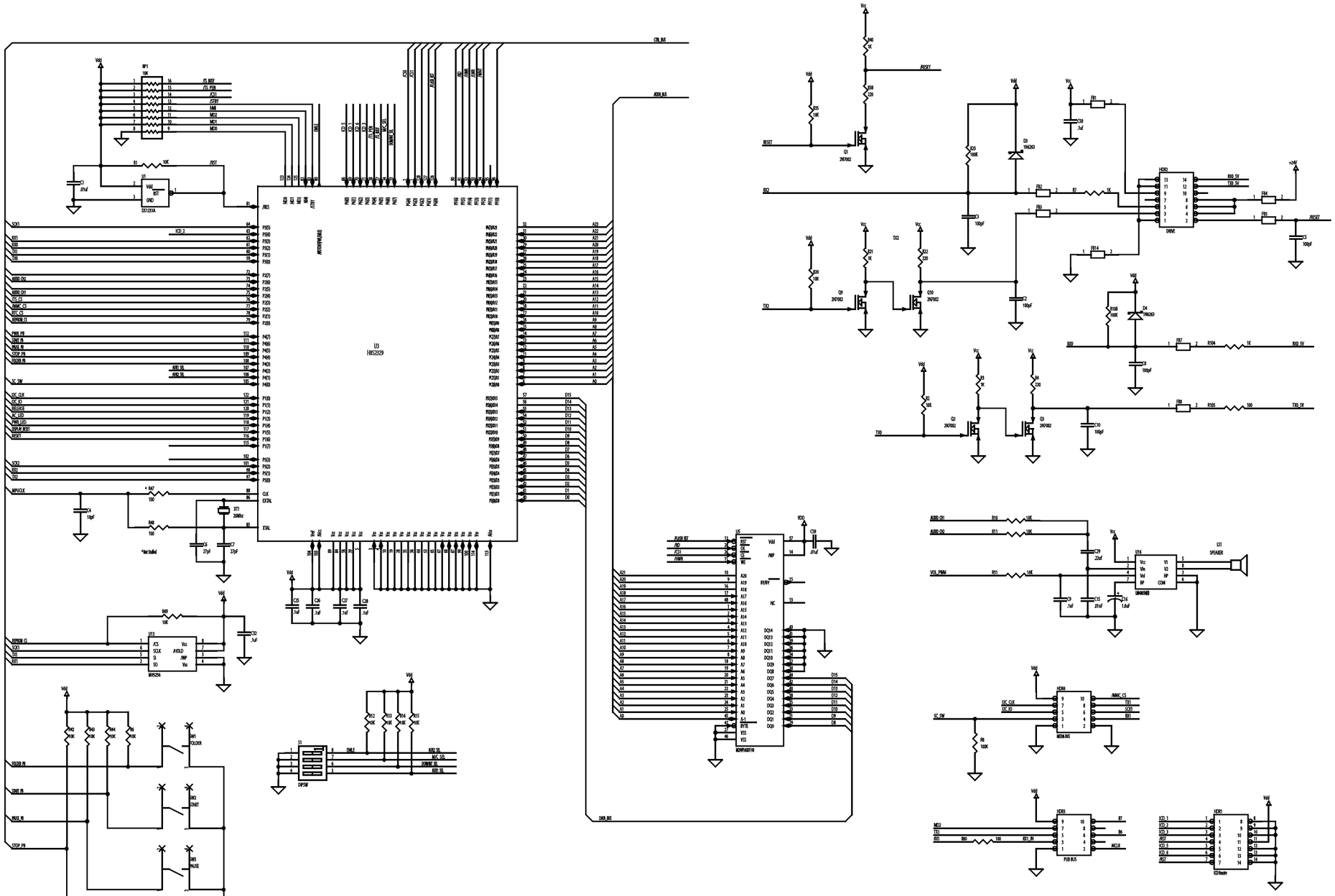
ITEM	PART NO.	DESCRIPTION	QTY
1	47997	Retaining Bar	1
2	48103	Spool	1
3	72017	Set Screw	2
4	47851	Screw	2
5	80158	Clamp Foot	1
6	47840	Hub	1
7	48104	Screw	4
8	71934	Bearing	1
9	47839	Large Driven Gear with Shaft Assembly	1

9.1 TRU-TRAC AND TX TRACTION UNIT SCHEMATICS

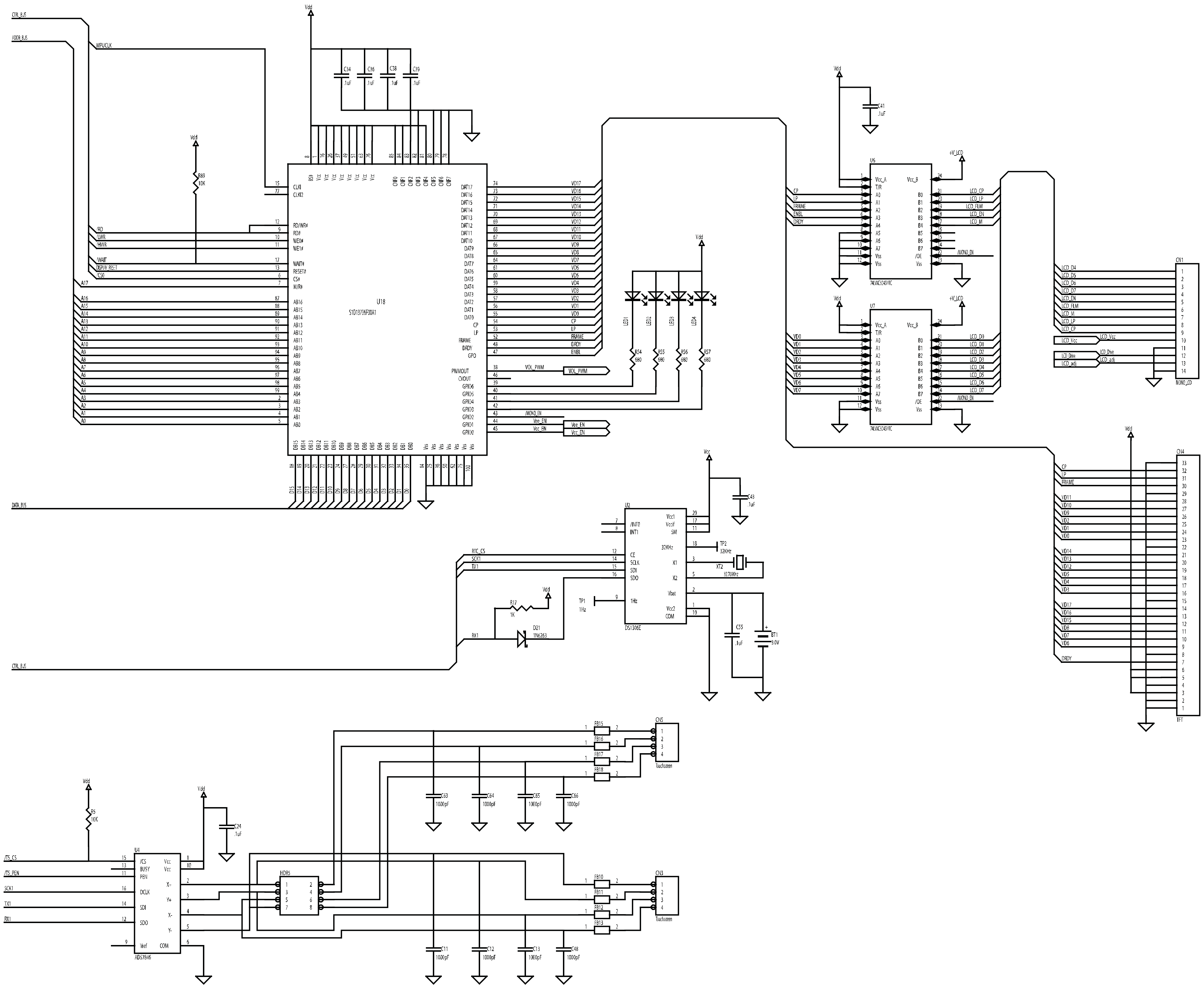
A. General Information

1. Due to the complex nature of the technology utilized by Chattanooga Group, the recommended PCB troubleshooting techniques are to determine "Bad Board" and board replacement only. No PCB component level troubleshooting is recommended, nor will information or parts be supplied by Chattanooga Group. Any PCB component level troubleshooting performed will be at sole risk and liability of the Service Technician performing such troubleshooting techniques.

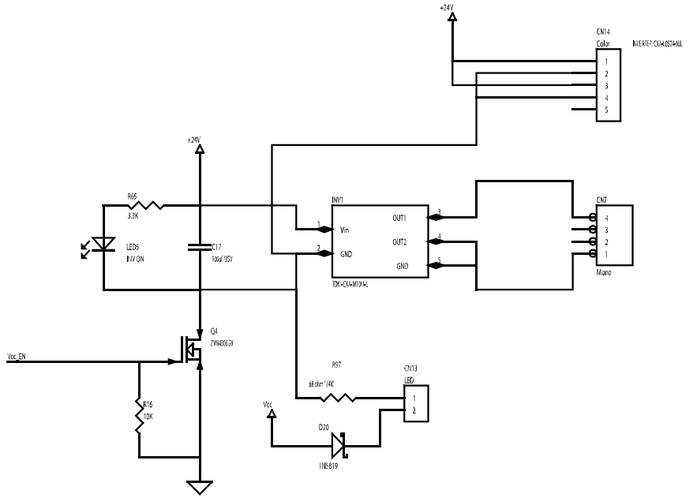
2. Once a particular PCB has been determined as bad, replace the PCB. Use only Chattanooga Group replacement parts and hardware. Refer to Section 8 Parts for replacement parts and assemblies.

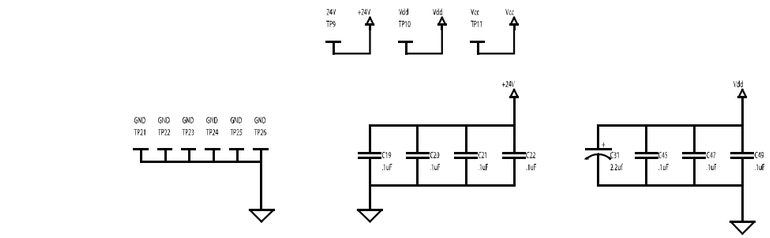


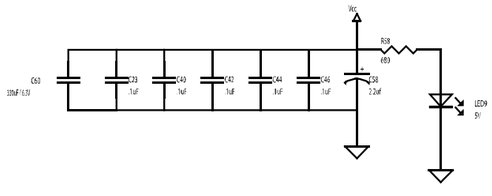
Control Board- 47801
1 of 3

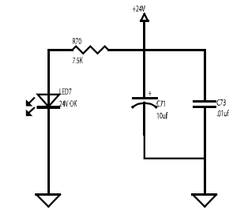

CTRL_BUS
ADDR_BUS
MPUCLK
DATA_BUS
Vdd
Vcc
U18
S1D13706F00A1
R89
10K
C34
C36
C38
C39
.1uF
/RD
/LWR
/HWR
/WAIT
DISPLAY_RESET
/CS0
VOL_PWM
/MONO_EN
Vee_EN
Vcc_EN
LED1
LED2
LED3
LED4
R54
R55
R56
R57
680
U6
U7
74LVXC3245MTC
+V_LCD
C41
CN1
MONO_LCD
CN4
TFT
LCD_Vcc
LCD_Drive
LCD_adj
U2
DS1306E
C43
RTC_CS
SCK1
TX1
RX1
R17
1K
D21
1N6263
TP1
1Hz
TP2
32KHz
XT2
32.768KHz
C55
BT1
3.0V
U4
ADS7846
/TS_CS
/TS_PEN
R5
C24
HDR5
FB10
FB11
FB12
FB13
FB15
FB16
FB17
FB18
CN3
CN5
Touchscreen
C11
C12
C13
C48
C63
C64
C65
C66
1000pF

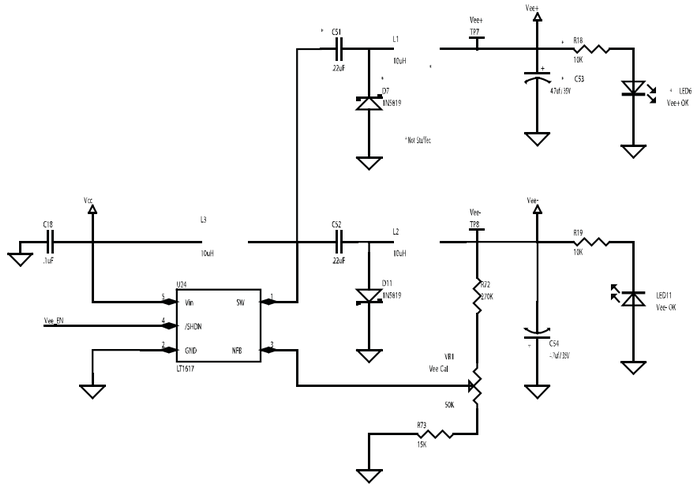
Control Board- 47801
2 of 3

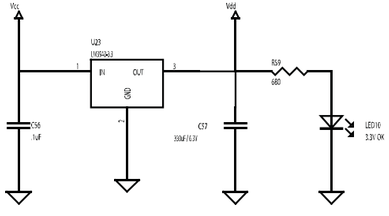


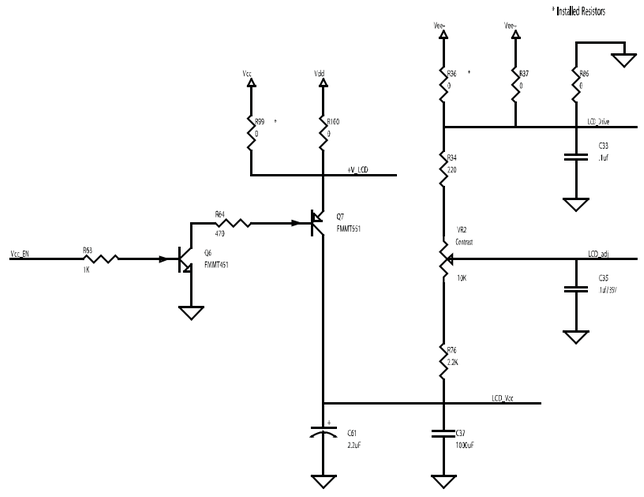


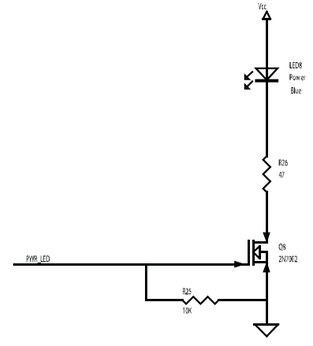




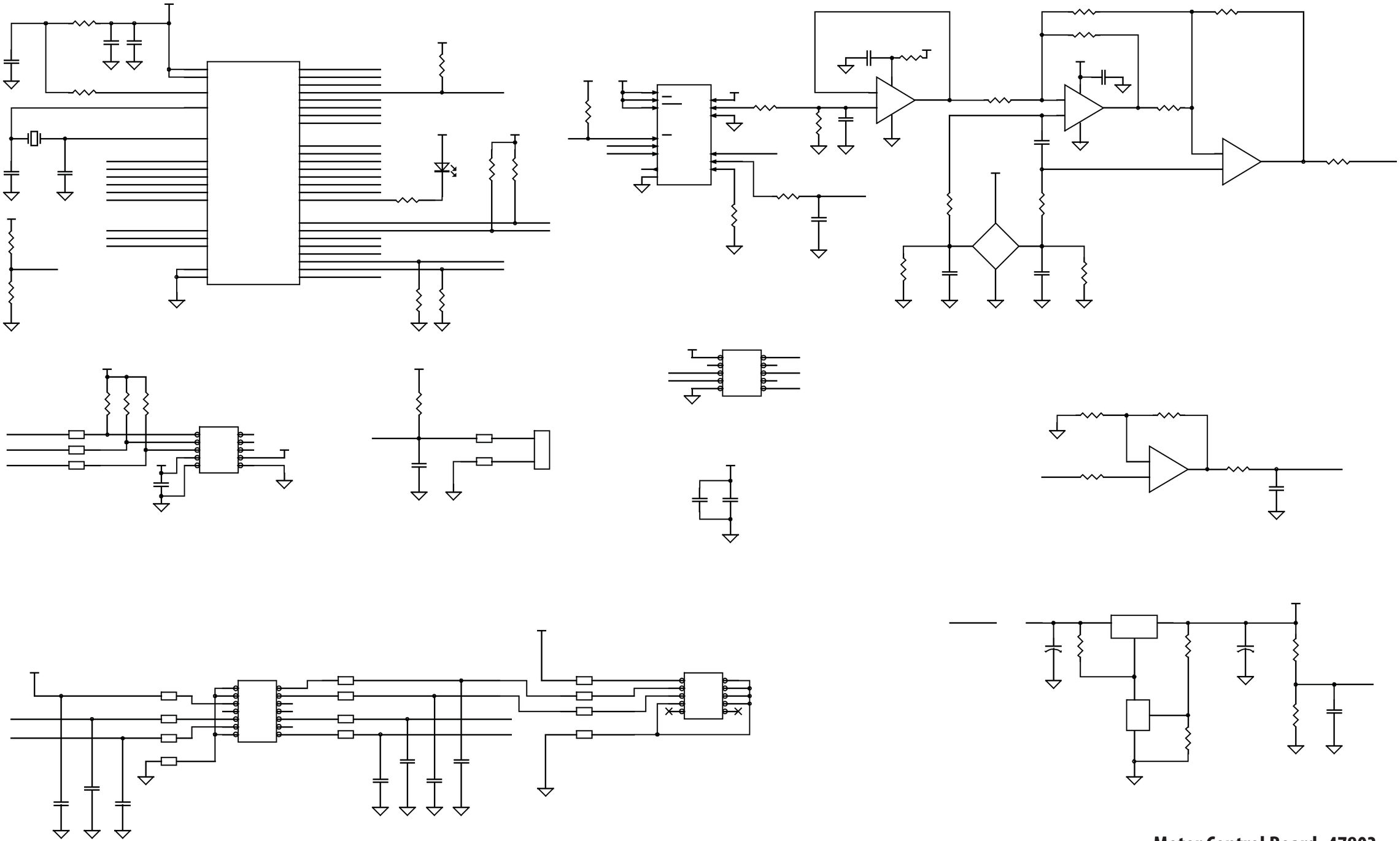




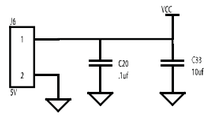


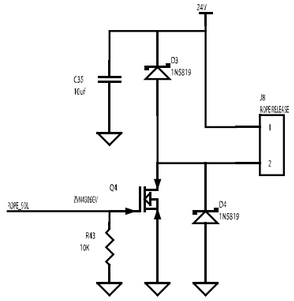


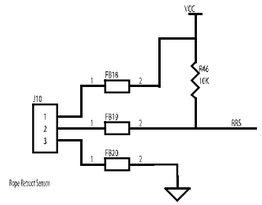
Control Board-47801
3 of 3

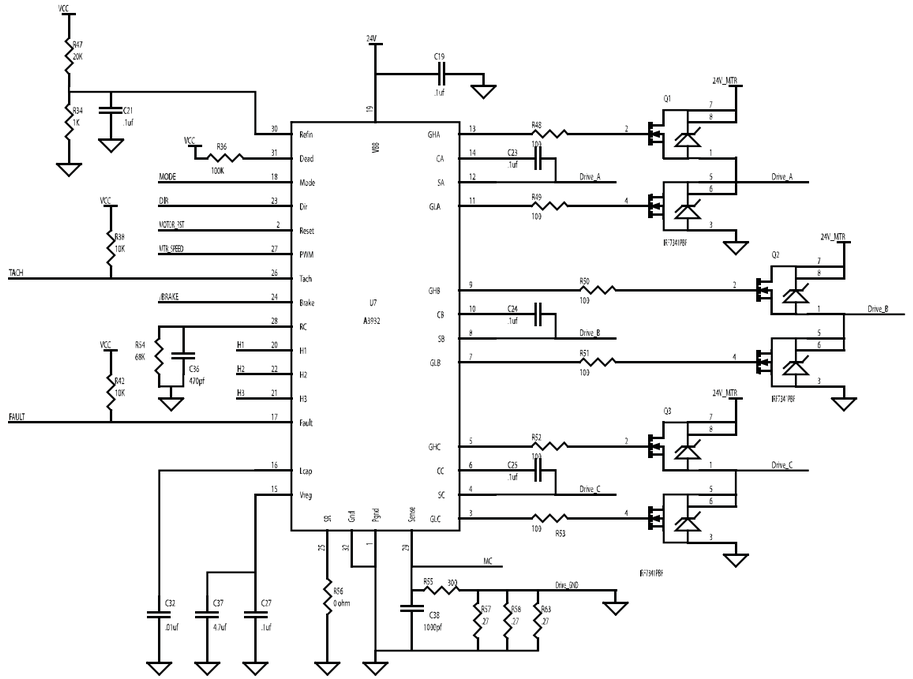


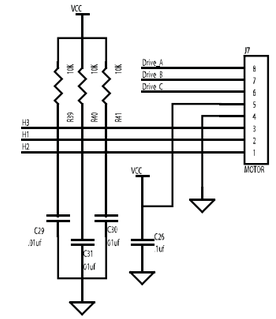
Motor Control Board- 47803
1 of 2

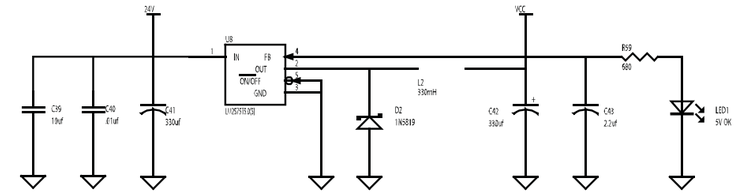


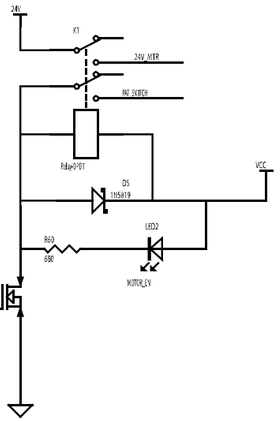


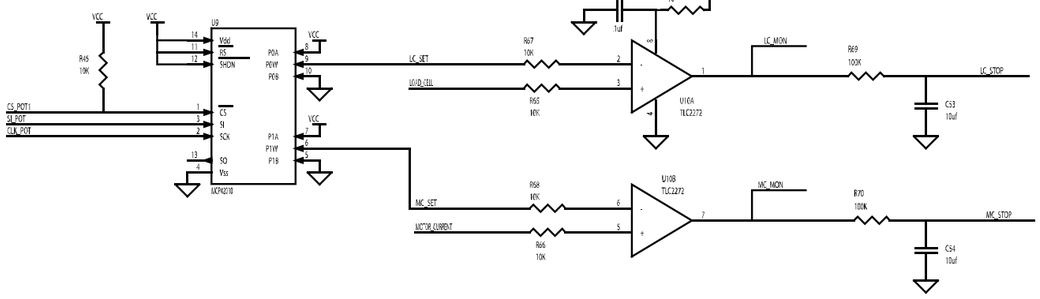


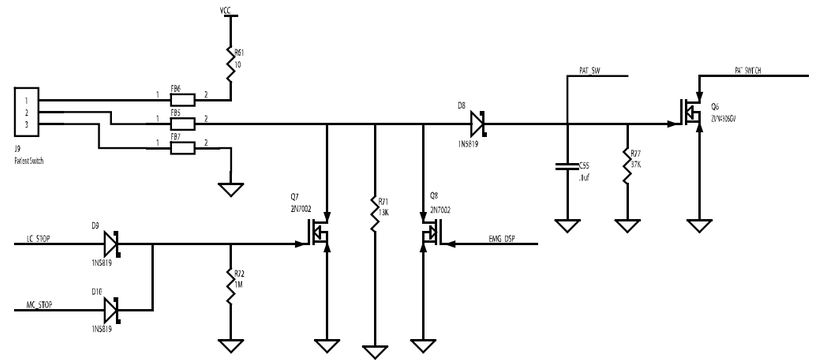




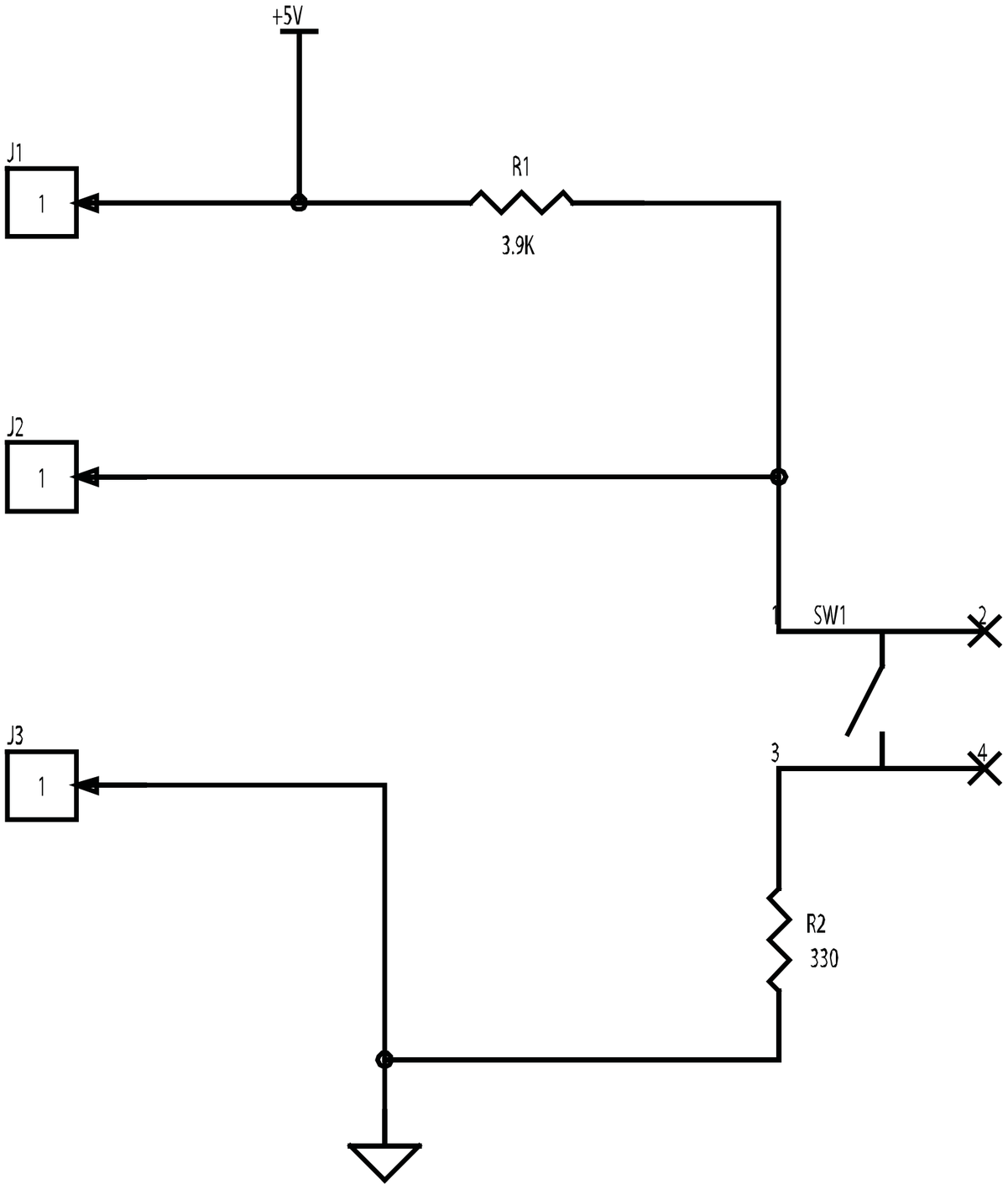




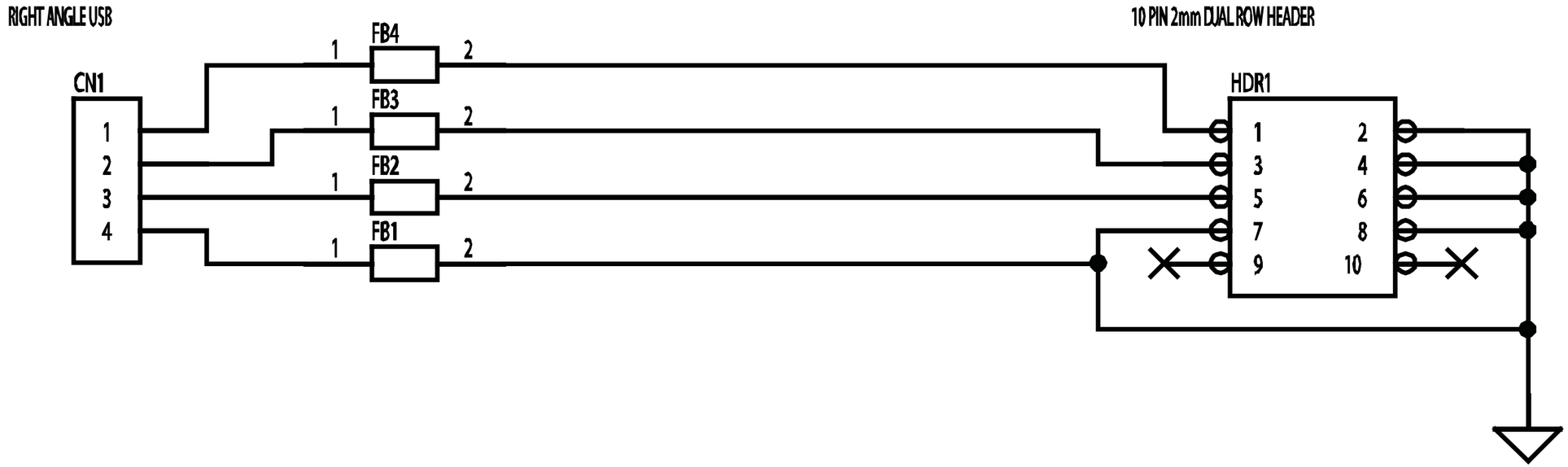




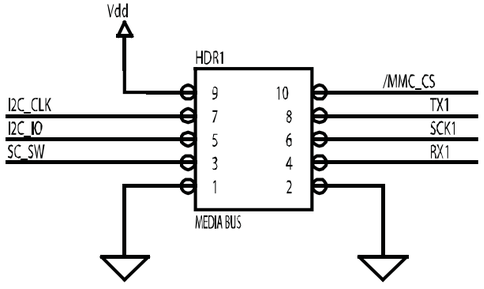
Motor Control Board- 47803
2 of 2

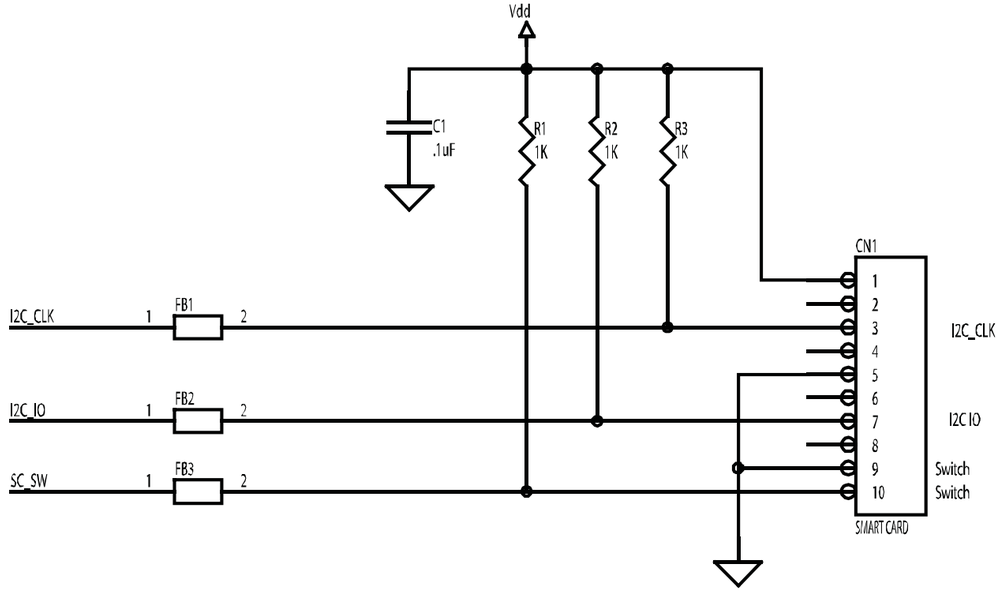


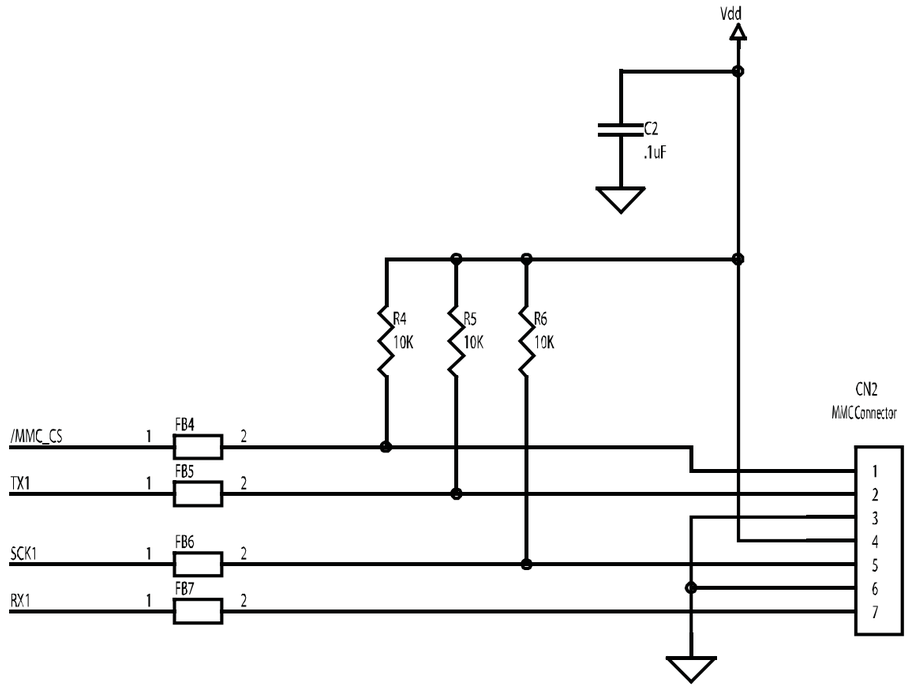
Patient Interrupt Switch- 48056
1 of 1



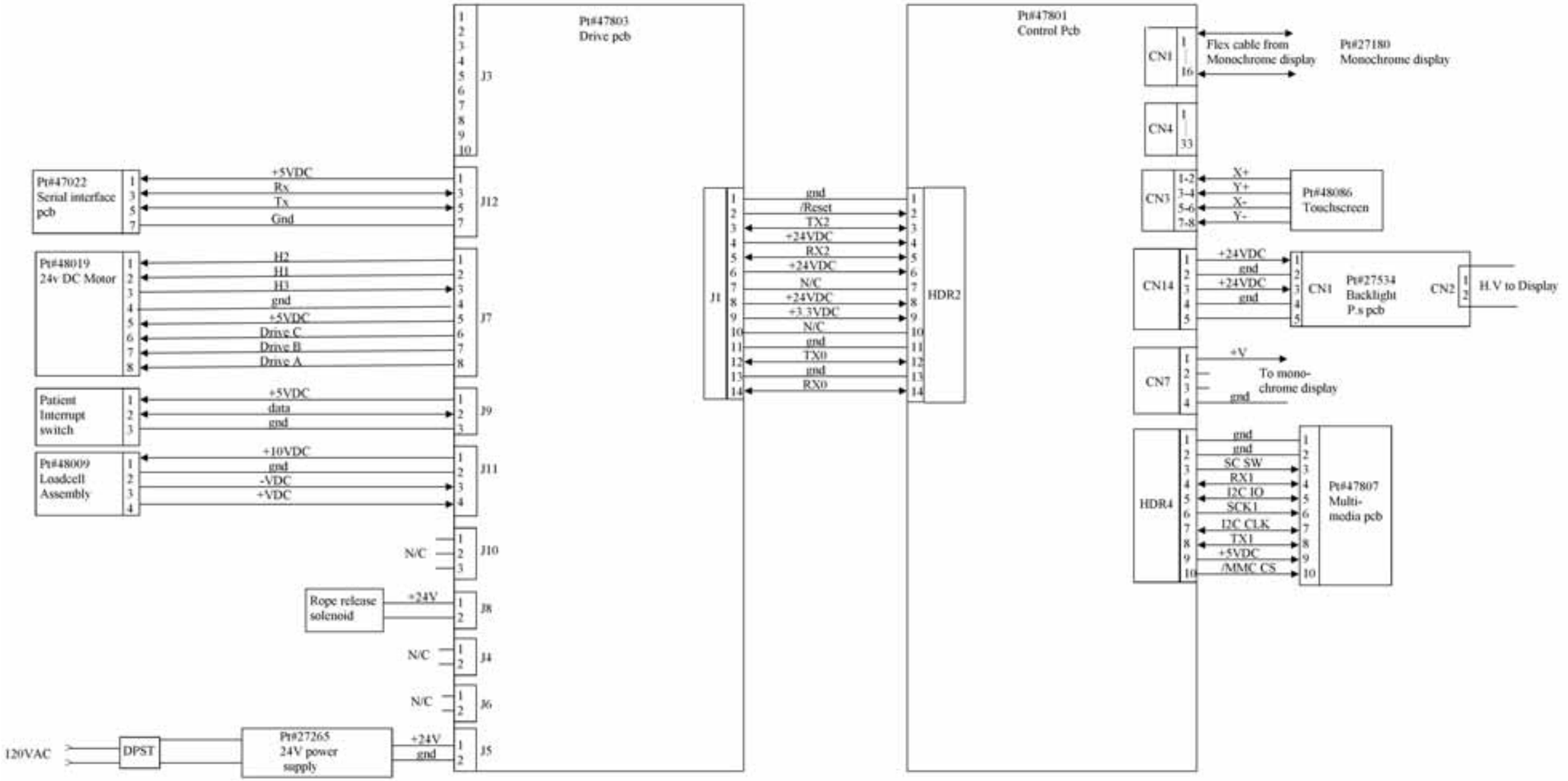
Serial Interface- 47022
1 of 1





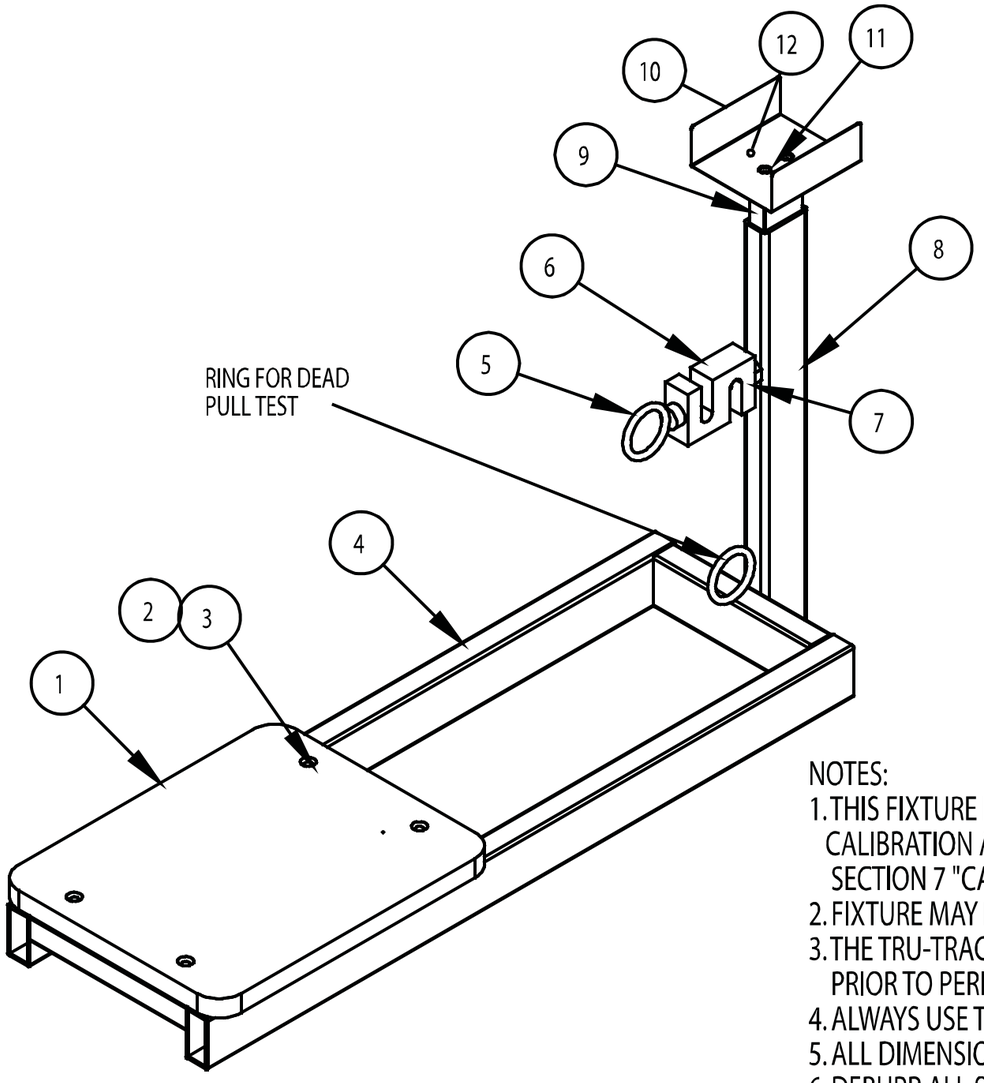


Smart Card- 47807
1 of 1



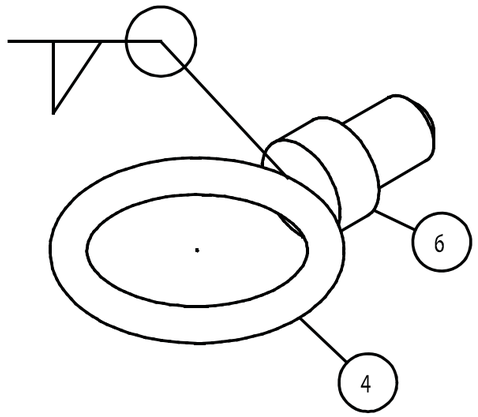
Block Diagram
1 of 1

10- SPECIAL FIXTURES

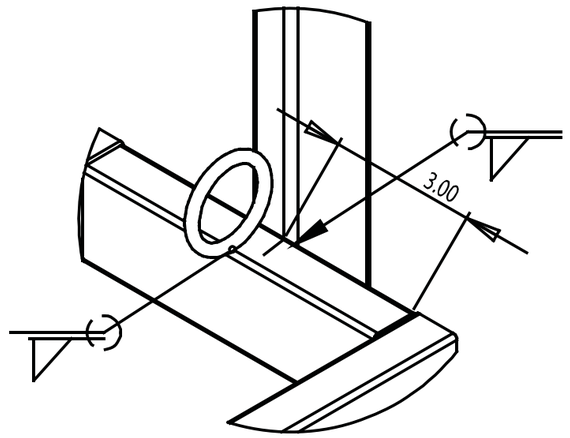


NOTES:
1. THIS FIXTURE IS REQUIRED TO PERFORM THE TRU-TRAC UNIT CALIBRATION AND BURN IN PROCEDURES. REFER TO SECTION 7 "CALIBRATION" IN SERVICE MANUAL.
2. FIXTURE MAY BE BOLTED TO A CART OR WORKBENCH.
3. THE TRU-TRAC TRACTION UNIT IS TO BE SECURED TO THE PLATFORM BOARD PRIOR TO PERFORMING UNIT CALIBRATION OR BURN IN PROCEDURES. REFER TO SECTION 7 "CALIBRATION" IN SERVICE MANUAL.
4. ALWAYS USE THIS FIXTURE IN ACCORDANCE WITH INSTRUCTIONS FOUND IN SERVICE MANUAL.
5. ALL DIMENSIONAL AND MATERIAL SPECIFICATIONS FOR THIS FIXTURE ARE EXPRESSED AS AMERICAN STANDARD (SAE).
6. DEBURR ALL SHARP EDGES.
7. THIS FIXTURE IS DESIGNED TO BE EQUIPPED WITH A DIGITAL LOADCELL AND METER.

Calibration Fixture
1 of 4

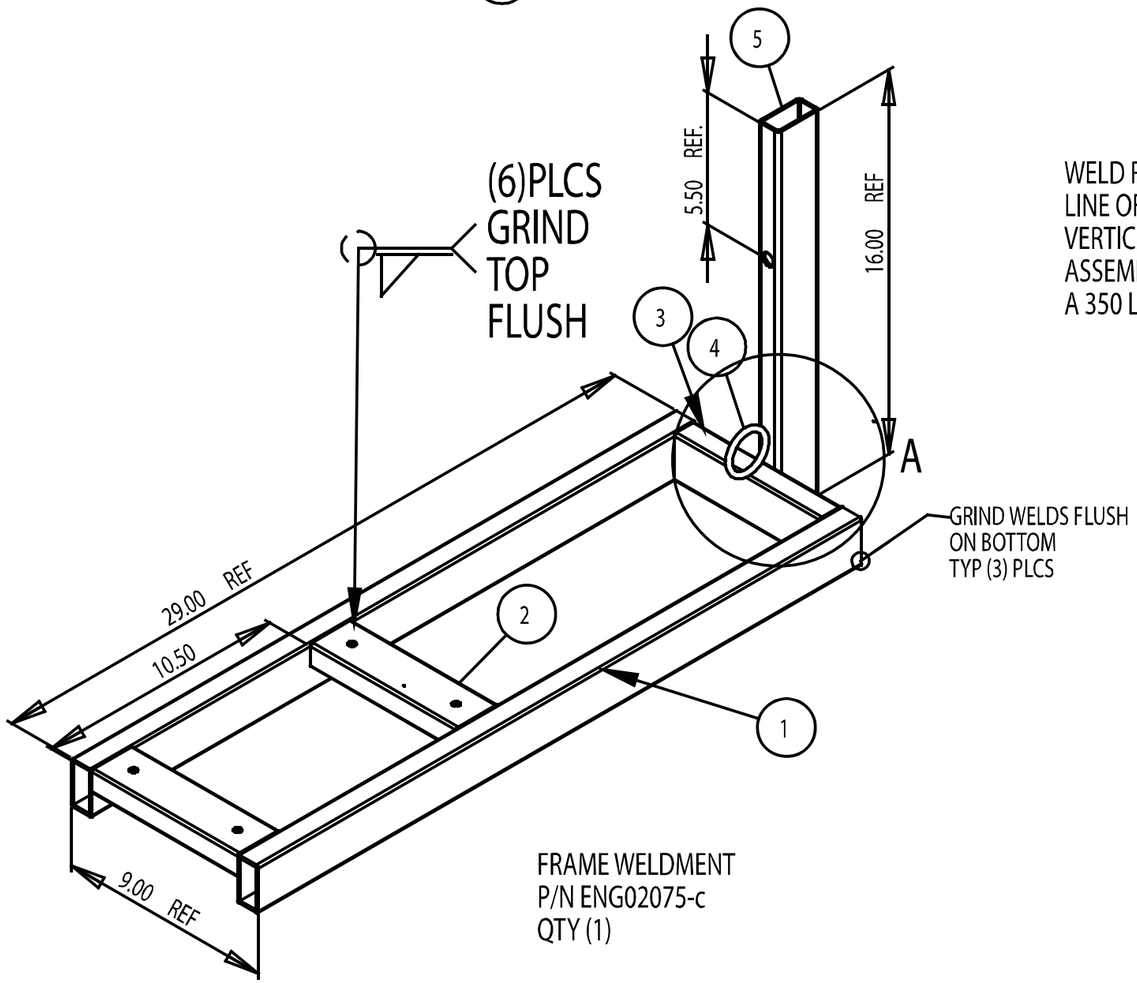


RING WITH SCREW
P/N ENG02075-b
QTY (1)
THIS ASSEMBLY SHALL WITHSTAND A
200 LB STATIC PULL AFTER WELDING



DETAIL A
SCALE 2 : 5

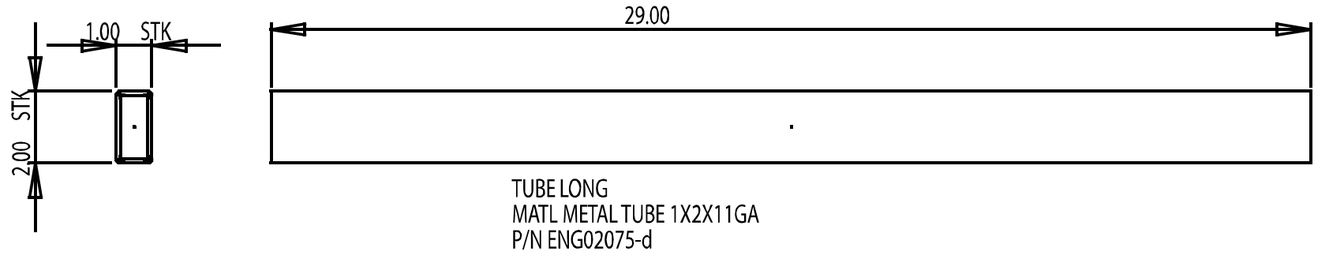
NOTE: DEBURR
ALL SHARP EDGES



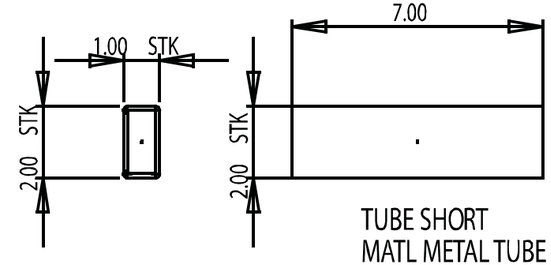
FRAME WELDMENT
P/N ENG02075-c
QTY (1)

WELD RING ON CENTER
LINE OF SHORT TUBE AND
VERTICAL MEMBER. THIS
ASSEMBLY SHALL WITHSTAND
A 350 LB STATIC PULL AFTER WELDING

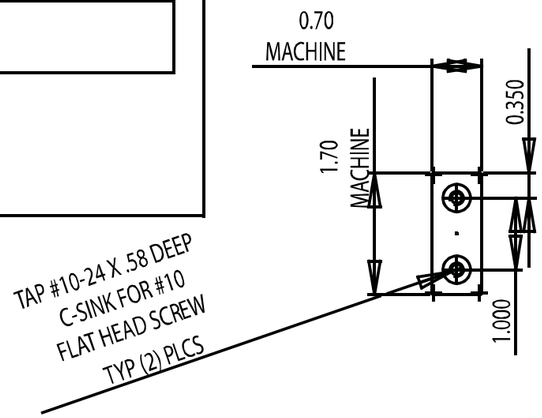
Calibration Fixture
2 of 4

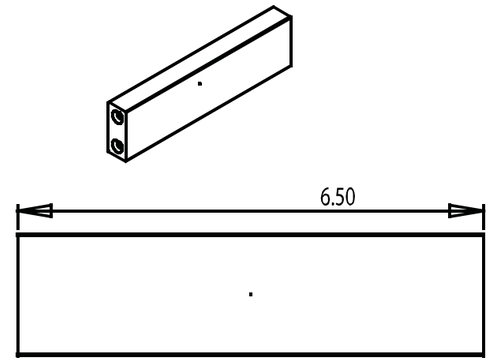


TUBE LONG
MATL METAL TUBE 1X2X11GA
P/N ENG02075-d
QTY (2)
(1:4)



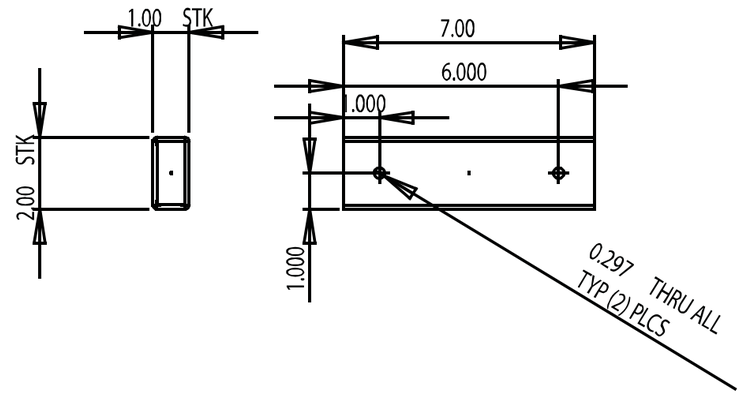
TUBE SHORT
MATL METAL TUBE 1X2X11GA
P/N ENG02075 -e
QTY (1)



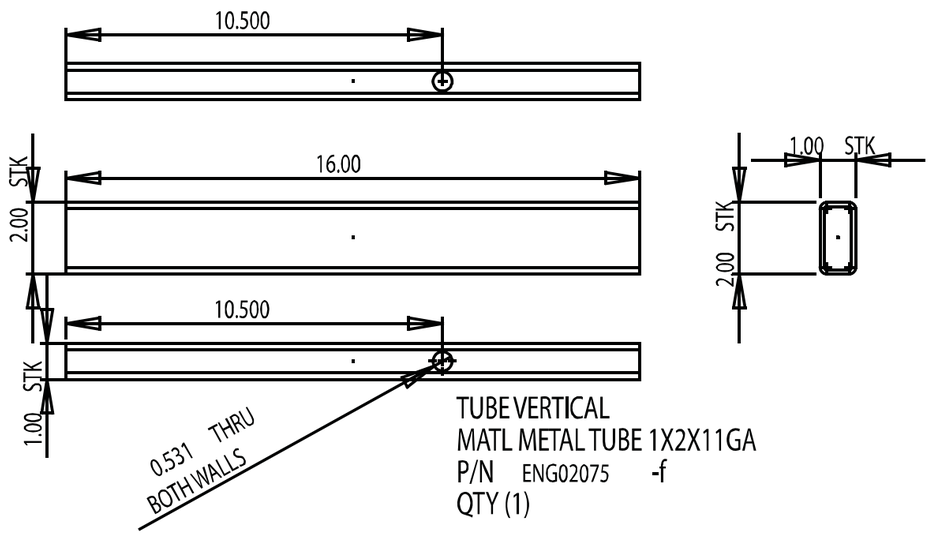


BAR PLASTIC
MATL UHMW
P/N ENG02075 -g
QTY (1)

NOTE: DEBURR
ALL SHARP EDGES

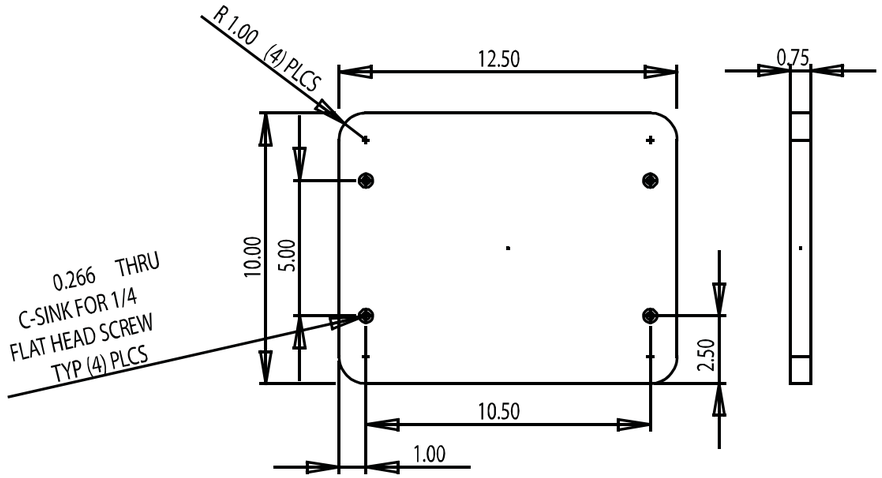


TUBE SHORT WITH HOLES
MATL METAL TUBE 1X2X11GA
P/N ENG02075 -h
QTY (2)

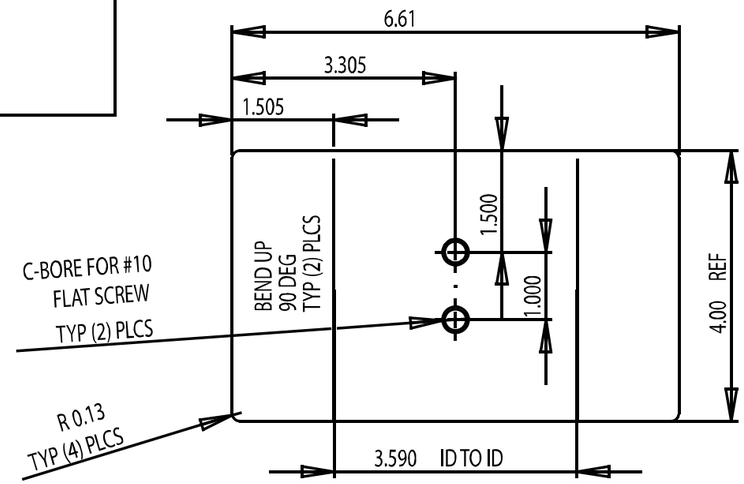


TUBE VERTICAL
MATL METAL TUBE 1X2X11GA
P/N ENG02075 -f
QTY (1)

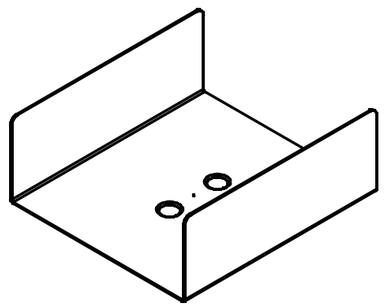
Calibration Fixture
3 of 4

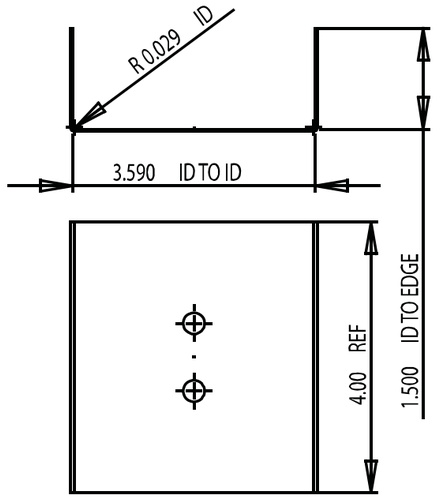


PLATFORM BOARD
MATL: PLYWOOD OR PRESS BOARD 3/4" THICK
P/N ENG02075-i
QTY (1)



FLAT LAYOUT





NOTE: DEBURR
ALL SHARP EDGES

STRAIN METER HOLDER
MATL: METAL SHEET ALUMINUM 14 GA
P/N ENG02075-j
QTY (1)

Calibration Fixture
4 of 4

11- WARRANTY

Chattanooga Group ("Company") warrants that the Tru-Trac and TX Traction Unit ("Product") is free of defects in material and workmanship. This warranty shall remain in effect for two years (24 months) from the date of original consumer purchase. If this Product fails to function during the two year warranty period due to a defect in material or workmanship, Company or the selling dealer will repair or replace this Product without charge within a period of thirty days from the date on which the Product is returned to the Company or the dealer.

All repairs to the Product must be performed by a service center authorized by the Company. Any modifications or repairs performed by unauthorized centers or groups will void this warranty.

The warranty period for accessories is 180 days. Accessories consist of Patient Interrupt Switch shipped with the unit.

To participate in warranty coverage, this Product's warranty registration card (included with Product) must be filled out and returned to the Company by the original owner within ten business days of purchase.

This Warranty Does Not Cover:

- Replacement parts or labor furnished by anyone other than the Company, the selling dealer, or a certified Company service agent.
- Defects or damage caused by labor furnished by someone other than Company, the selling dealer, or a certified Company service agent.
- Any malfunction or failure in the Product caused by product misuse, including, but not limited to, the failure to provide reasonable and necessary maintenance or any use that is inconsistent with the Product User Manual.

COMPANY SHALL NOT BE LIABLE IN ANY EVENT FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.
To obtain service from Company or the selling dealer under this warranty:

1. A written claim must be made within the warranty period to the Company or the selling dealer. Written claims made to the Company should be sent to:

   4717 Adams Road
   P.O. Box 489
   Hixson, TN 37343 USA
   Phone: USA: (800) 592-7329
   Fax: (423) 875-5497
   Canada: (800) 361-6661
   Outside USA: +1 (423) 870-7200
   Outside USA Fax: +1 (423) 870-2046

2. The Product must be returned to the Company or the selling dealer by the owner.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state or location to location.
The Company does not authorize any person or representative to create for it any other obligation or liability in connection with the sale of the Product. Any representation or agreement not contained in the warranty shall be void and of no effect.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

CHATTANOOGA GROUP
A DIVISION OF ENCORE MEDICAL

ISO 13485 Certified

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